Determinism in Education

W. C. Bagley

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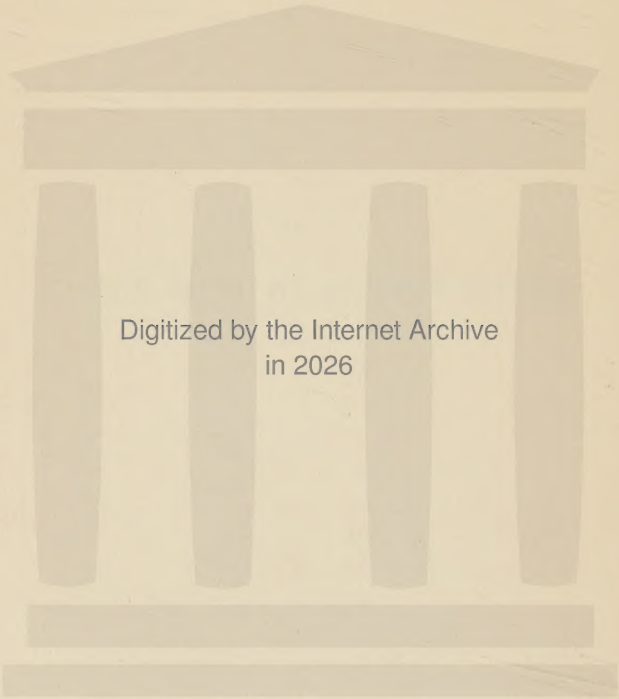
DETERMINISM IN EDUCATION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DETERMINISM IN EDUCATION

A Series of Papers on the Relative Influence of Inherited and Acquired Traits in Determining Intelligence, Achievement, and Character

BY

WILLIAM C. BAGLEY

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PREFACE

The papers included in the present volume have been prepared by the writer during the past four years. They deal with the old problem of heredity *vs.* environment,—a problem now brought into the very focus of social significance by the mass of appealing and plausible evidence drawn to the support of the hereditarian hypothesis from the results of the so-called intelligence tests. The papers set forth certain facts and arguments that tend to discredit the fatalistic implications of this evidence, and, by the same token, to confirm and justify the two hypotheses upon which, in the writer's judgment, a rational faith in democracy must rest: (1) that education, far from being merely an expression or concomitant of intelligence, plays a positive and indispensable rôle in the development of intelligence; and (2) that, perhaps in a limited and yet in a very real sense, education *does* operate as an equalizing force among individuals of varying degrees of native endowment,—in short, that education is (or can be made) in some measure a "leveling-up" process.

Paper I ("Democracy and the I. Q.") is reprinted practically as it was given before the Society of College Teachers of Education in February, 1922, in a joint discussion with Professor Guy M. Whipple. Paper II ("Some Further Implications of Determinism") includes portions of the writer's rejoinders to the criticisms of the first paper that were advanced by Professor Whipple and by Professor Lewis M. Terman. These rejoinders were published, respectively, in *School and Society* and in *The Journal of Educational Research.*

Papers III, IV, and V assemble evidence chiefly of a statistical character revealing the close correlation between past provisions for mass-education and present-day levels of social stability, intelligence, economic efficiency, and leadership; and the less close but still positive correlation between past provisions for mass-education and present-day levels of basic morality and respect for fundamental law. The thoroughgoing consistency of this evidence, drawn as it is from a wide variety of independent sources, abundantly confirms the writer's contention that the justification of universal education must be sought and can be found in social statistics. The evidence, indeed, should appeal even to the seasoned skeptics;—of whom there are two types in our field, those who strain at a common-sense gnat and then swallow a statistical camel, and those who reverse this interesting feat of mental deglutition;—for here at last both common-sense and statistics tell the same story.

Paper VI ("The Army Intelligence Tests and the Pro-Nordic Propaganda") reveals the amazing inconsistencies in the appeals to race-prejudice that have drawn a specious sustenance from the results of the intelligence tests. Here, too, have been gnats and camels a-plenty, as well as an inexplicable closing of supposedly open "scientific" minds to facts that must have stuck out like so many sore thumbs in every pertinent investigation of this fundamental problem. Paper VI is reprinted, with the courteous permission of the publishers, Messrs. Doubleday, Page and Company, from the *The Educational Review* for April, 1924.

Paper VII ("Education as a Creative and an Equalizing Force") summarizes the principal investigations that have appeared since 1922 bearing upon the questions raised in Paper I. These investigations not only con-

firm the position taken by the writer in his earlier discussion, but they also justify a far more liberal attitude toward the equalizing effect of education than seemed at all tenable at that time.

About one third of the material in the book has not been published heretofore. The statistical tabulations that appeared in earlier publications have been checked for accuracy, and (in Paper IV particularly) enlarged and entirely reworked in the light of data that have only recently become available. A number of quantitative measures by means of which state populations may be compared have been reduced to "standard scores" and complete tables of ratings and rankings are printed as an appendix.

The writer is heavily indebted to many of his colleagues and to large numbers of his students for aid, advice, and criticism in the preparation of these papers. This debt is in no way lightened for the writer by the fact that probably a substantial majority of these persons have been very far from agreeing with his contentions. Fortunately students of education are on the whole a tolerant and catholic group and the writer has consequently been able, on this and other fundamental issues, to be an iconoclast without the sacrifice of fellowship and friendship. His gratitude to those who differ with him is, therefore, of a peculiar texture—thoroughly sincere and yet quite as sincerely tinctured with the conviction and hope that, since most of them are still young, their chances of redemption are still good.

The writer wishes to express his gratitude particularly to Dr. Lois Hayden Meek, of Washington, and Mr. W. Daniel Ellis, principal of the Richmond, Virginia, City Teachers College, for their painstaking work in assembling many of the statistical data set forth in Papers III and IV; to Mr. C. B. Allen, of Berkeley,

California, for similar aid; to Mr. Joy E. Morgan, Editor of the National Education Association, for numerous courtesies connected with the publication of Paper IV in the the Association's *Journal;* to Dr. J. K. Norton, Research Director of the National Education Association, for securing the data on commitments to the Federal prisons included in Paper V; to his colleagues, Professors I. L. Kandel and J. R. McGaughey, for many important corrections and suggestions; and to his sister, Miss Ruth G. Bagley, and to his wife for their criticisms especially of the several "first drafts" out of which Papers III and VII finally emerged.

Acknowledgment is also due to Mr. H. E. Buchholz, president of the publishing house of Warwick and Work, for his generosity in suggesting that the papers be assembled in their present form, and for his courage in assuming the financial burden of their publication. To his own intelligent faith in democracy, Mr. Buchholz has given clear and convincing testimony (witness his book, "Of What Use Are Common People?"). This faith may explain in part his willingness to stand sponsor for the present venture. In any case, the writer entertains a hope that the facts and arguments herein set forth may do their mite toward extending and strengthening the same faith.

WILLIAM C. BAGLEY.

May, 1925.

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DETERMINISM IN EDUCATION

CHAPTER I

DEMOCRACY AND THE I. Q.[1]

I

There is a prevalent conviction that the influence of education is very narrowly circumscribed by traits or capacities which, for each individual, are both innate and in themselves practically unmodified by experience or training. This attitude is no new thing; within the past ten years, however, it has been given an emphatic sanction and a very widely extended currency by the development of mental measurements, and particularly by the hypothesis of "general intelligence" which has been brought into high relief by the measurement movement.

It is the purpose of the present paper to show that the sanction which mental measurements apparently give to this particular variety of determinism is based, not upon the facts that the measurements reveal, but upon the hypotheses and assumptions that the development of the measures has involved; that these hypotheses and assumptions, while doubtless justified for certain purposes, are at basis questionable in the last degree; and that the present tendency to extend them *ad libitum* beyond a very restricted field is fraught with educational

[1] An address before the Society of College Teachers of Education, Chicago, Ill., February 27, 1922.

and social dangers of so serious and far-reaching a character as to cause the gravest concern. The paper will also attempt to show that, even if the assumptions are granted, many of the fatalistic inferences drawn from the data in hand are not justified.

I wish to say at the outset that I have no personal animus in this discussion. For the notable achievements of those working in the field of mental measurements I have the highest respect and the warmest admiration. Many of these workers have been very cautious regarding the inferences that they have drawn, whether from their assumptions or from their facts. Many of them, indeed, are not "determinists" in the sense in which I use the term, and would in no case be subject to the criticisms that I shall apply to the deterministic school. Even those who are radical determinists are sincere in their beliefs; and among them are men so keen and so competent that it is with the greatest reluctance that I venture to challenge the validity of their conclusions. Were it not for my conviction that there is at stake a great ideal,—an ideal that has already cost more in the terms of human striving and suffering and sacrifice than anything else in this world of ours—I would not for a moment presume to pit my judgment against the judgment of men for whom I have a respect that amounts in many cases to a veneration.

It is sincerely with this attitude that I proceed to the tendencies of present-day determinism in our field,—tendencies which the assumption or hypothesis of a native "general intelligence" is encouraging.

II

In the first place, in order to prove that I am not attacking a man of straw, I shall present documentary evidence showing the extent to which some of the alleged

facts and interpretations in the field of intelligence testing have been generalized in fatalistic conclusions. I may take as an example the apparent support that these alleged facts and interpretations give both to those who wish to see restored the older social order based on distinctions of birth and to those who oppose the expenditure of public funds necessary to provide on a universal scale education of the type that will be needed if the ideals of democracy are to be realized. I quote from an editorial in a recent issue of an English educational journal:

"Last month we drew attention to the significance of Lord Inchcape's observation that there are 'limitations of the economic usefulness of education.' The *Pall Mall Gazette* has now gone one better. It has made the discovery (on the authority of Dr. R. R. Rusk, lecturer on education to St. Andrew's University) that 70 per cent of the children of this country 'will never develop any more intelligence than that which should be possessed at the age of fourteen, and, consequently, further education is wasted on them.' Of the remaining thirty 'only four will be found fit to take an Honours degree at the university.'

"This 'discovery,' the result, we are told, of psychological tests made on children in America, Germany and Scotland (but not apparently in England) has suggested to the *Pall Mall's* correspondent a method whereby 'education will be improved and, at the same time, expenditure decreased.' In future a series of tests applied to each child between the ages of three and twelve will enable the authorities to know exactly which of them is fit for further continued education; so that 'a great economy would be effected through the removal from school of a large number of dull and useless children,' and 'better provision would be made to develop the brain of the supernormal child.'"[1]

I may also refer to the able article by Mrs. Cornelia James Cannon in the *Atlantic Monthly* for February, 1922, as indicating clearly the inferences that an intelligent lay mind can hardly fail to draw from the published

[1] *The Torch*, London, January, 1922.

reports of the results of the psychological tests as given in the Army. Mrs. Cannon, after a careful study of this and other measurement literature, reaches unquestionably fatalistic conclusions regarding the possibilities of education. She even states that the evidence apparently justifies the conclusion that practically one half of the adult population of our country can be classed as morons.

It may be objected that both of these cases represent the interpretations of amateurs in this field. In answer I quote the following from an editorial in one of the two leading technical journals that represent the measurement movement in this country:

"Those who evince a given degree of mentality have it as a possession as inherently as they have blue eyes or Roman noses. Unconsciously the school, year after year, sifts through meshes of larger and larger size those who are relatively less capable, and retains those whose endowments mark them for intellectual success[1]

"As an institution devoted to preparing the young for more complete living, the school has always been so much an agency of selection that it is a question whether those who receive its benefits are as much developed as they are *certified* for the affairs of life.".

This is a sample of the conclusions that are being drawn by some of the professional students of mental measurements, not from the facts that they have discovered, but from the assumptions that they have made. May I follow a little further the implications of this editorial? What is this thing called mentality which is here stated to be just as definitely given or withheld by heredity as are blue eyes and Roman noses? Eyes and noses are anatomical structures the determinants of which are fairly well understood. Mentality, whatever it may be, is clearly not an anatomical structure, but

[1] *Journal of Educational Research*, February, 1921.

a function. Even as a function, there are the widest divergences of opinion among the determinists themselves as to just what it does, let alone what it is. That it is closely bound up with the anatomical structure that we call the nervous sytem all agree; but the essential elements of the nervous system are emphatically *not* the stable and unchangeable kinds of structure that iris-pigment and the bones of the nose just as emphatically are. When I began the study of psychology a quarter of a century ago, I was taught that the degree of mentality depended upon the number of nerve cells in the cerebral cortex. Fifteen years later, we had come to the conclusion that differences in the readiness of synaptic connections were the physiological basis of differences in mentality. In other words we had shifted the basis from an anatomical structure to a physiological functions. Today there seems to be a possibility that the readiness of synaptic connections depends upon the stimulating effect of endocrines which have their origin, not in the nervous system at all, but in certain glands, notably the pituitary, the thyroid, and the adrenals. Thus mentality, which the writer just cited identifies so nonchalantly with a pair of simple anatomical structures, is clearly not a structure but a function; and, to the best of our knowledge, it is not even the immediate function of any structure or set of structures, but rather the end function of intermediate functions of other functions, which ultimately, we believe, work back to interlocking groups of structures through a maze the complexities of which have so far baffled every effort at analysis.

I wish not to be misunderstood. I am not an obscurantist. Some day the puzzle will be solved. But what we know already is more than sufficient to discredit any such artificial simplification as is represented by

this crude and deceptive analogy between degree of mentality and blue eyes.

III

I hesitate to say that this is a fair sample of the determinist's reasoning. I am convinced, however, that many if not most of the fatalistic inferences that he draws from his postulates are equally questionable. If he answers that in this particular case he was talking in words of one syllable for simple folk, let me follow him into some of his more fundamental assumptions.

These may be illustrated by the emphasis that he continually places upon innate traits as contrasted with educative influences in determining human character and human achievement. A good example is the implication that the school has always been much more a certifying agency than an educating agency. We know, of course, that large numbers of children have left school, and that some of these have left because they could not do the work that the school demanded; but this is very far from saying that the mentality of those who remained was more important than the teaching to which they were subjected in determining their character and achievements. Mr. Colvin, in his very sensible discussion of intelligence tests in the *Nineteenth Yearbook* of the National Society for the Study of Education, makes this statement: "The brightest European child reared from birth by a group of African pigmies would appear as a moron or worse if later transported to a highly civilized and cultured environment." According to the determinist, however, the teacher who works some of the most important of these miracles of transformation is only a rubber stamp to certify that his pupils have a certain amount of native intelligence. Again I

submit that the determinist has come to some of the most sweeping of his conclusions not from a contemplation of his facts but through an *a priori* process of reasoning from his assumptions.

Let me now, with due humility, examine the basic assumption that underlies the whole theory of mental measurements. Native mentality or native intelligence, the determinist himself will admit, is not directly measured by the tests. What is measured? Let me again quote Mr. Colvin:

"*We never measure inborn intelligence; we always measure acquired intelligence, but we infer from differences in acquired intelligence, differences in native endowment when we compare individuals in a group who have had common experiences and note the differences in the attainment of these individuals.*"[1]

This, then, is the assumption back of the I. Q. which is playing so important a part now in our educational programs and which threatens to overturn the entire theory and practice of democratic education. The validity of mental measurements and of every inference that is drawn from the alleged facts that the measurements have disclosed is based upon the assumption that, with respect to the materials of the tests, the environment, the experience, the education, the stimulation, and the inspiration of those compared have been identical. We have had assumptions in science before this; in fact, the history of science is largely the history of assumptions and hypotheses. They have their place. This particular assumption has its place, and restricted to this place I grant its pragmatic justification. Generally speaking, its justification is clearest in the simplest tests which detect differences between some mentality and no mentality at

[1] *Nineteenth Yearbook*, Society for the Study of Education. Part I, p. 19. (Italics in the original.)

all. As we pass from the lowest to the higher "mental ages," the validity of the assumption is rapidly weakened. The tests even then measure a certain ability or group of abilities, but the contributions of experience become so numerous and influential that it is the height of absurdity to contend that it is a native and unmodified factor that is being measured. Yet this contention is made the basis of sweeping conclusions regarding what education can or cannot do. If the determinist claims scientific validity for these extensions of his theory I say without fear of contradiction that no theory in the whole history of science has been based on a group of assumptions so questionable.

IV

Let us see how the determinist abuses his assumptions. On the basis of tests which admittedly measure the influence of experience he argues back to a hypothetical factor which, far from having isolated, he has never clearly defined. The closest that he has come to a satisfactory definition is to call this factor "ability to learn." He then, by an act of pure imagination, reads out of the product everything that experience, education, and training have contributed. He has no notion of how much they have contributed or where their contribution stops. Only recently he has been confronted with the conclusion, based upon the statistical methods which he himself has employed, that not less than 54 per cent of whatever it is that is measured as native intelligence turns out to be the result of experience and training. And yet his confidence in his early inferences seems to be unshaken. He makes some striking statements about the residue that he calls mentality or native

intelligence. He says it is innate, (a conclusion with which, granting all of his previous assumptions, it would be difficult to quarrel) and he sometimes implies that it is a unit character. He concludes that it can never be modified by the experiences which he has assumed that it has acted upon and the products of which constitute his only measure for the thing itself. He is convinced that it grows (just as anatomical organs grow) from birth to a very definite point which varies among individuals, but which, for most people, is fairly early in life, at which point like anatomical structures it "stops short never to grow again." This point, which seems to be purely hypothetical, has jumped back and forth over the chronological ages between 13 and 18, like a veritable grasshopper, displacing by several degrees at each jump the I. Q.'s of all individuals who have passed the age in question. Wherever the growth stops, however, there suddenly appears an abrupt restriction of the further educational possibilities of the great masses of people. For these people, apparently, "mentality" never changes. Whatever it is, they have so much of it and no more. For the chosen few, on the other hand, further education is not only a possibility but the very hope of civilization. By this time the assumptions reach these people, the factor, which originally was ability to learn or to "take education," has become ability to "deal in abstractions." A little later, through some alchemy, it becomes "ability to solve new problems." Finally, it emerges into a full-blown "capacity for leadership."

Armed with this simple formula, the determinist now starts out to make over education. And this leads me to another tendency in the inferences that he draws from his assumptions. I quote from a book on intelligence published in 1919:

"The relative permanency of the I. Q. enables us to predict with some degree of approximation the mental level a child will attain by a given age. . . . Facts have been presented which show that the limits of a child's educability can be fairly predicted by means of mental tests given in the first school year. By repeated tests these limits can be determined accurately enough for all practical purposes by the end of the child's fifth or sixth school year. This early, at least, vocational training and vocational guidance should begin."[1]

We have here a clear tendency on the part of the determinist to limit the general education of a large proportion of children to what can be given in the first five years of school life.

What is meant by the "limits of a child's educability"? Does this imply the point at which the hypothetical factor called native mentality or native intelligence stops growing? Assuming that this is the meaning, are all channels of education then permanently closed? The determinist will say, No; not that. But, he will insist, all channels of *intellectual* education are essentially closed when certain predictable limits have been reached.

Personally I venture, again with due humility, to suggest that, even granting his hypothesis, the determinist has not taken into account all of the possibilities. Suppose we assume the definite and limited endowment of mentality that lies at the basis of the determinist's inferences. Are there not clearly two kinds of mental growth that may be predicated? One is the natural growth of the capacity from birth to the time when it stops increasing in magnitude or power or ability or whatever it is that comprises its prime essential. But all this time, by the very assumptions that the measurements involve, it is busy acquiring experiences. When

[1] L. M. Terman: "The Intelligence of School Children," Boston, 1919, pp. 157–158; p. 269.

it has reached this maximum does it suddenly cease to function? And is not the growth that takes place thereafter essentially mental growth? If you agree, let us call that kind of growth for the sale of contrast *horizontal* growth, and let us call the natural growth of the function itself *vertical* growth. For the sake of the argument I will grant that vertical growth is limited if you will grant that the possibilities of horizontal growth are essentially limitless.

Now I should like to continue this figure a little further. What do we mean by *intellectual growth?* For here, I wish emphatically to assert, the great issue lies. By intellectual growth the determinist means, I am sure, increased capacity for dealing with experience in those compact forms that we call abstractions, abstract ideas, or concepts,—the materials, in short, of "conceptual" thinking. Is this kind of growth possible on these horizontal levels?

What are the facts in the case? Take a man whom you would find by your measurements to be of average or even somewhat below average mentality, the "common man,"—*Homo ubiquitus*,—whose educational opportunities I am attempting to safeguard. Consider this man in his daily business. Does he not grow in his power to deal abstractly with problems as he becomes increasingly familiar with them? I assert most emphatically that he does. I further assert that with the proper kind of instruction he can be taught to deal with many of the abstract problems that the determinist has in mind when he proposes to exclude everyone except the high I. Q.'s from the privileges of secondary and higher education. The question as to whether society can profitably undertake such an educational enterprise I shall consider in a moment when I shall prove that society either must undertake it or perish.

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Before considering that problem, however, I wish to dwell a little on this cool proposal to separate the sheep from the goats at the close of the sixth school year. With the constancy or persistence of the I. Q. still in doubt the edict has gone forth that, "for all practical purposes," it is safe to predict a child's future at the age of twelve. It is "safe," in other words, to stamp the twelve-year-old child with the brand of permanent inferiority. It is "safe" to neglect the broader education of mediocre and dull children, to let them be satisfied with a narrow specific training that will fit them only for routine work, and to reserve the higher privileges for the "gifted" children. With his instruments of selection admittedly faulty, with his measures that measure something that no one has yet been able to define, the determinist proposes this policy and seeks to justify his proposal on the high grounds of social welfare and especially of social progress.

May I observe that the high grounds of social welfare and social progress furnish the physician a much better justification for letting the weak die than they furnish the teacher for abetting the determinist's policy? The analogy has some useful lessons. The determinist talks loudly about his "facts." The *facts* with which the physician was long familiar would have justified him in the belief that the development of his art, by preventing the elimination of the weak, would work toward the deterioration of the race. But the physician knew that all the facts were not in,—and pending further light on so important a matter he trusted to his ideals. He went right on developing his art and saving human lives without stopping to ask whether society would not the better profit by their extermination. And with what result? The death-rate has been progressively lowered, human suffering has been mitigated, and if

there is any evidence that the human species has deteriorated under this humane ideal, it has not as yet been presented.

I submit that the facts are not yet all in with respect to this crucial problem which the determinist has essayed to solve out of hand and almost overnight, and I further submit that hypotheses based on so confused a mass of facts as those already available should be held in abeyance were they then ten times as plausible as are the determinist's theories of to-day.

V

I come now to the most significant tendency of the theories which the determinist has constructed—again not on the basis of his facts, but on the basis of his assumptions. I refer to the inevitable application of his inferences, with all of their questionable logic, to the theory of democracy and the ideals of democratic education.

Here the professional writers are fairly wary and circumspect. They are not antidemocratic. Far from it; only democracy does not mean what most people have believed. Intelligence is not everything, they assure us; it is only one of the many innate traits that condition achievement. A person may have a high degree of intelligence and still be a failure in life; or he may succeed on a fairly slender margin. Of late, too, the determinist has discovered that the inescapable differences in native intelligence fit in admirably with our industrial development. If automatic machinery provides gainful occupation for the predetermined human automaton, the evils that Mr. Pound and others have conjured up regarding the Iron Man of modern industry become of trifling significance. I have not seen this suggestion extended from modern industry to modern art, but it might

well be. I refer chiefly not to futuristic painting nor to free verse, but to the modern universal drama of the screen where, more emphatically even than in modern industry, the moron seems to have come at last into a real kingdom.

Equity of opportunity, then, is the only true democracy according to the determinist. Give every child opportunity, he says,—opportunity to develop precisely as his original nature dictates: this one into an artisan, that one into an artist; this one into a machine operative, that one into a "captain of industry"; this one into a clerk, that one into a "merchant prince"; this one into a teacher, that one into an "educator." The determinist is very skeptical about the possibility of teaching some lessons; but he apparently has no doubt that one lesson can be effectively and universally taught. Every man, he nonchalantly assumes, can be taught to know his own place, appreciate his own limitations, and mind his own business.

But if the professional determinist is very careful to assure us that his hypotheses are not at all anti-democratic in their tendencies, this is not true of at least one lay student of the problem. Mrs Cannon, in the article already referred to, frankly entitles her discussion: "Democracy in Question: American Misgivings." Personally we prefer this frankness to any attempt to camouflage the issue with fine distinctions between equalities and equities. No one could ask for a more straightforward statement than the following quotation presents:

"Nothing is more obvious than that the differences in ability to take education are as extreme as the differences in intelligence itself . . .

"The subjects basic to a civilized community life must be given alike to all: the three R's, some knowledge of the ideals of a form

of government such as ours, and the duties and responsibilities of citizenship therein. But beyond the earlier ages of education, is not the community entitled to a pretty rigorous policy of selection? . . . In any country, is not education necessarily a process of establishing a group trained for greater responsibilities than the average? . . . Educational processes are helpless in the face of native incapacity. Not more than a pint can be poured into a pint receptacle . . . For our own sakes we must select our best for the types of training that demand a high order of ability."[1]

It is salutary to look the problem thus squarely in the face. If the determinist is right, the ideal of democracy is wrong; the forces that have resulted in a democratic social order are forces of social involution and not of social evolution; the educational aims and ideals that have gone hand in hand with the ideal of insuring a certain kind of equality among humankind, are a tragic, even ghastly, mistake. The determinist talks loudly and frequently about wanting the truth. If he is right, this is the truth and he should not try to evade it.

VI

Let us come then to the real issue, namely, the need in democracy for a high level of informed intelligence as a basis for collective judgment and collective action. We cannot dodge this issue by saying that those who cannot "take" this kind of education may take some other kind that is far better for them individually. This may be true, but let us not deceive ourselves by calling it democratic. The unmistakable trend of democracy has been toward the elevation of the common man to a position of supreme collective control. Within a century in our own country, the franchise has been made universal. Our government is a representative government in form; in fact, it is coming every day

[1] *Atlantic Monthly*, February, 1922, p. 155.

closer to a type of direct government controlled by the great masses of the people. It is this variety of democracy that has lately spread through the world. It is this variety of democracy that was imperiled in 1914 and saved in 1918. It cannot now be a question of going back to an earlier form of social control. It is now, as it has never been before, a "race between education and catastrophe." If education is to save civilization it must lift the common man to new levels—and not so much to new levels of industrial efficiency as to new levels of thinking and feeling.

What has the determinist to propose in place of this program? He would apply his intelligence tests to discover the future leaders. Having thus selected them in advance he would give them every advantage and stimulus to turn their native abilities to the benefit of society.

I shall not dwell upon the quite obvious obstacles in the way of this solution. It would be easy to show that an intellectual aristocracy is just as reprehensible as an aristocracy based upon family or upon wealth. You may say that you prefer the airs of a self-anointed *intelligentsia* to the airs of inherited or new-found wealth. Off and on I have lived next door, so to speak, to both, and I can assure you that there is little to choose between them. Nor shall I worry much over the contention that the future "leaders" whom the determinist would select now and train for their future responsibilities should have such training in order to sensitize them to the responsibilities that they must assume. With no fear of contradiction, I can affirm that the safest guarantee of sincere and responsible leadership lies in a level of informed intelligence among the rank and file that will enable the common man to choose his leaders wisely, scrutinize their programs with sagacity, and, encourage

them to relinquish the duties of leadership gracefully and speedily when they go wrong.

The proposal to apply the intelligence tests in selecting at an early age those who are to be the later leaders of the nation has received a sanction, and in my humble judgment a most specious sanction, from the success of the tests in the Army. In selecting the men who are better able than their fellows to learn new duties quickly, tests which measure this capacity have an obvious value. In how far these men owe their superiority to innate traits and in how far to education, we have now no certain means of knowing, although the determinist as usual is cocksure that education has nothing to do with it. Be that as it may, to argue from the situation in the Army to the situation in the nation as a whole overlooks a very important difference. The personnel of the Army does not choose its own leaders; the personnel of the nation does. The personnel of the Army does not pass final judgment on the plans and policies that the Army seeks to realize; the personnel of the nation does. If, a generation hence, we were to engage in a war and if our army at that time were to be democratically organized, choosing its own leaders and formulating its own policies, plans, and campaigns, what would be the best way to get ready for that war? I venture a Yankee guess that, if we loved our country, we would move heaven and earth to give the rank and file of that future army all of the information, all of the training in thinking, all of the bases for a wise selection and a keen evaluation of leadership, that we could find, organize, feed to them, or force down their throats.

Now we hope not to have another great war; and if we do we shall probably not fight it with an army such as I have described. But our people tomorrow, a year from tomorrow, ten years from tomorrow will be facing

and trying to solve problems compared with which the greatest military campaign is child's play. And these problems must be solved under the guidance of leaders chosen by the rank and file and through programs that are constantly subject to evaluation, to revision, and to rejection by the rank and file. Yet because some difficulties stand in the way of preparing the great masses of the people to interpret these problems intelligently, the determinist proposes to throw overboard the democratic ideal of education; to substitute a deceptive "equity of opportunity" for a whole-hearted effort to bring the masses of our children up to a reasonable intellectual standard; and to devote educational efforts to the training of leaders the great majority of whom, under an ignorant electorate, would fall to a quick defeat at the hands of the demogogue and the political machine.

VII

The determinist's skepticism of the influence of education reminds one of the dilemma in which dialectic left the Greek philosophers with regard to the possibility of motion. If a body is to move from position *A* to position *B* through intervening space, it must first traverse half the distance; but before it can do that, it must traverse half of this first half; before that, it must traverse half of the quarter; and so on through the infinite halvings of the endless remainders. How in the world, then, is a body ever to get started? We are told that this problem remained unsolved for a matter of two thousand years or more. There is no record, however, that bodies remained patiently motionless until the theoretical obstacles in the way of their movement had been removed.

The clear tendency of educational determinism, is to leave us with a negative philosophy of education,—a

collection of statements regarding those things that the school simply cannot do. That it can do anything except certify as to the presence or absence of certain innate abilities seems about as impossible from the point of view of this philosophy as movement was to the old dialecticians. And yet, as we have suggested, bodies actually went on moving in spite of the theoretical bonds that held them stationary. And in spite of the educational determinist, boys and girls of all but the very lowest, sub-human intelligence levels learn with varying degrees of rapidity some extremely difficult and involved skills, such as reading, writing, and computation, and master with more or less anguish of soul some fairly abstract conceptions like the form and motions of the earth, the principle that taxation without representation is tyranny, and the various complicated notions about money that is paid for the use of money. Causes and explanations for which the brightest minds sought in vain during long generations and which were finally laid bare only through the most laborious researches of the keenest intellects are now comprehended with tolerable clarity not only by the superior minds of the race but literally by the multitudes. Natural laws that a Galileo, a Newton, a Helmholtz, and a Darwin were alone competent initially to grasp and formulate are now made the possession of vast numbers of men and women. The nuances of human character that first required a Shakespeare for their detection and portrayal can now be recognized and acted upon by the common man.

I make no absurd claim that if I teach an average man the principle of gravitation, let us say, I am making the common man equal to Newton in originality, acumen, alertness, or whatever other qualities made Newton one man perhaps in a thousand million. I do maintain

that I have enabled this common man in a very real way to participate in the experiences of one of the most gifted men of all time; I maintain that I have given him one control over his environment substantially equal to that which this gifted man himself possessed; and I maintain that *in respect of this possession* I have made this common man the equal of all others who possess it. There are undoubtedly some men who could never grasp this conception, but I should wish to refine my teaching processes far more than teaching processes have yet been refined before reaching any fatalistic conclusions as to where the line is to be drawn.

VIII

I have spent much time in reflecting upon the meaning of those alleged differences in native mentality which spread themselves so symmetrically over the frequency surface, and which are so conveniently translated into the numerical scale of intelligence. In order to be sure that I should not misinterpret the implications of this scale I asked a recognized authority in the field of measurements certain questions regarding the units in common use. I asked first whether the mode clustered about I. Q. 100. He replied that it did. *Homo ubiquitus*, it seems, ranges from about 85 to 115 on this scale. Taking a common man at 100, I asked where the idiot would fall. I was told that 40 is a fairly low point. In answer to another inquiry, I was confirmed in my belief that the I. Q. 160 represents the bright and alert individual whom we find occasionally among our fellow men. I then asked this question, "Is the common man separated from this bright and alert fellow by the same chasm that separates him (the common man) from the idiot?" The reply was, "Yes; the differences are the same, but they are not so visible in the former case."

Now this "low visibility" oddly enough is the illumination of a glorious light. Certainly the common man is separated from the idiot by an impassable gulf; yet to even the most brilliant of his fellows he is bound by a thousand ties.

Differences in native mentality, of course, are biologically inevitable. It is not their existence but their meaning that we are concerned with. What the determinist has forgotten is that resemblances in ideas, ideals, aspirations, and standards may and do unite men by bonds that are vastly stronger than are the differences in native endowment that would otherwise pull them apart.

A great mistake of the determinist has been to confine his thinking to organic evolution; he thinks only of the forces and factors that governed progress from the dawn of life to the dawn of mind. He forgets that, with the dawn of mind, new forces were let loose which transformed the entire character and course of progress. He forgets that, with the dawn of language still other forces were let loose,—for from that time on the common man could share the thoughts and feelings of the most gifted of his immediate fellows. He forgets how this great force of common experience was immeasurably broadened and strengthened by the art of writing and the art of printing which made it possible for the common man not only to enter into the experience of his immediate fellows, but almost literally to stand upon the shoulders of all the tall and sun-crowned men who had gone before. He is forgetting that the development of the universal school is the latest scene in this great drama of social evolution.

IX

Personally I have still to be convinced that this process of social evolution will disappoint the world in

its rich promise to bring humankind into a real brotherhood. What education has already done is only a feeble portent of what education can and will do as its forces become better organized and more keenly alive to their tremendous possibilities and their tremendous responsibilities. If I have seemed not to be cognizant of the great services which the science of mental measurements has already rendered and of the still greater services that it will render in the future, it is very far from my design. For everything that is positive and constructive in its teachings there will always be a warm welcome. For whatever it has to present that is negative and destructive it must clearly assume the burden of proof. We should be false to our trust, false to our ideals, if we did not take and hold this position. The truth we must all face, bitter though it may be; but we have a right to be sure that it is true before we are asked to swallow the pill.

The determinist admits that skillful and devoted teachers can do something even with morons. As I have watched these teachers at their work it is not what they cannot do that has impressed me, it is the miracles that their consummate art has enabled them to perform. I have seen dull eyes lighted with a momentary gleam of intelligence. It was a little light in a world of darkness. But grant that little light glowing with rapidly increasing intensity as we go up the intelligence scale, and my case is won. A little more light for the common man this year, next year, a hundred years from now, and the battle for humanity, for democracy, and for brotherhood is won.

CHAPTER II

FURTHER FALLACIES OF DETERMINISM

The preceding paper was discussed and at many points severely criticized by representatives of the deterministic school of psychology. Especially forceful articles were published by Professor Guy M. Whipple[1] and Professor Lewis M. Terman.[2] While both of these writers are frankly hereditarian in point of view, they are far less radical than many of their colleagues. Professor Terman is especially emphatic in disclaiming any purpose of neglecting the education of children who are not "gifted," and in maintaining that "the one purpose of intelligence-testing in the schools is to aid us in making the most of every child, the dull as well as the bright." With this ideal no one could justly quarrel,—but what it means "to make the most of every child" is not a simple problem to solve. Clearly, social as well as individual factors are involved in its solution, together with certain psychological and biological factors that the determinist has apparently failed to recognize.

To the articles of Professors Whipple and Terman, the present writer replied in separate rejoinders.[3] His chief contentions are reprinted[4] herewith.

[1] In *School and Society*, June 3, 1922.

[2] In *Journal of Educational Research*, June, 1922, pp. 57 ff.

[3] The rejoinder to Professor Whipple was published in *School and Society*, Aug. 5, 1922, pp. 141 ff; the rejoinder to Professor Terman appeared in *Journal of Educational Research*, December, 1922.

[4] With the courteous permission of The Science Press and of the Public School Publishing Company.

1. What the tests *directly* measure is not native ability but acquired ability. The interpretation of the results of the tests in terms of native ability involves the assumption that educational and other environmental influences have operated with equal force upon all individuals compared. This assumption is always questionable except under rare conditions. Even with these limitations, the tests have a large field of usefulness in determining differences in capacity for learning. To what extent the differences disclosed are primarily due to environmental influences, to what extent they are modifiable by training or treatment, and above all what their meaning is in terms of educational aims and policies, are questions of paramount importance to which the determinists have given little attention, presumably because of their conviction (1) that the differences are essentially innate, and (2) that the only significant task of education is to train and instruct those who can "take" training and instruction the most easily.

2. Refinement of methods of instruction is the greatest need in the education not only of the normal and subnormal, but also of the supernormal; and while the provision of a *pervasive common culture* is the prime function of democratic education, this does not necessarily mean an absolutely uniform curriculum, nor does it preclude an abundance of differentiation in what may be termed "non-essentials."

3. Even admitting that a high degree of intelligence with a moderate degree of industry makes for more rapid school progress than does a moderate degree of intelligence with a high degree of industry, it would seem that the important *ultimate* question is not the rate of school progress but the ultimate product. Even admitting that a high degree of intelligence with a moderate degree of whatever human qualities underlie

leadership makes for more rapid school progress than the converse combination, again the important question has to do, not with the rate of school progress, but with the ultimate equipment of the men and women who inevitably will wield an influence.

4. I take issue with Professor Whipple's statement that, "in our present educational system, the gifted child in particular is given far less opportunity to develop his potential promise than is the average child." I call attention to the following facts: (*a*) The United States has developed for its gifted children secondary and higher institutions in a measure, and supports them with a generosity, unapproached by any other nation; and yet the teachers of the elementary schools, which are the schools attended by "all the children of all the people," represent lower standards of training than do the teachers of the elementary schools of any comparable nation. (*b*) An outstanding criticism of the curricula of both our elementary schools and our high schools is that they are adapted to the abilities of the brighter children rather than to those of the average child. Although personally I am confident that better trained teachers can overcome many of the difficulties which these curricula present to average minds, the fact is universally admitted that, under present conditions, it is the child of superior intelligence who has the distinct advantage.

5. I also take issue with Professor Whipple's prediction that, "if any nation is destined to perish it is that one which fails to provide the best possible educational training for those of its rising generation that show promise of intellectual leadership." Recent history presents the most convincing testimony against this prediction. Russia had her universities and her secondary schools. Her prewar universities were world-famous. Her *Gymnasien* in 1914 enrolled more pupils

than did the secondary schools of any other country except the United States. What Russia neglected was the education of her masses,—the world knows with what disastrous results.

Contrast too, the countries of Central Europe that are now struggling to emerge from the chaos left by the war. Contrast Czechoslovakia, where the tradition of Comenius has kept the ideal of popular eduction alive for three centuries, with Jugoslavia which lacked such a tradition. With Rumania contrast Bulgaria, which of all the Balkan countries had made prior to the war the greatest advances in elementary education. Contrast the relative stability of the German masses backed by their eight years of *Volksschule* training, narrow though it was, with the instability of the south-central peoples among whom primary education was far from universal. Rank the nations of the world as they stand today with regard to their promise of stability and progress; go back to 1913–14 and rank the same nations with regard to the per cent of the population enrolled in the elementary schools (these figures can be found in the reports of the Federal Bureau of Education); the correlation of these two rankings is one that, in Professor Whipple's phrase, "approaches unity."[1] I advance it in support of my fundamental hypothesis that the education of the great masses of the people is of vastly more significance to any nation than is the refined and advanced training of the few,—important as I gladly admit the latter to be.

6. The determinists overlook the clear decline in the significance of intelligence differences as one goes up the scale; in other words, *education does tend in many ways to equalize individuals of varying mentality.*[2] One person,

[1] See a further reference to these facts in Ch. III.

[2] Evidence supporting this contention is set forth in Ch. VII

in commenting on my paper, asked this question, "How can you believe that, among all biological traits, mentality alone is not subject to biological variation?" Of course I hold no such belief; whatever the biological bases of mentality may be, they are certainly subject to the laws of variation; but, in so far as I am informed, mentality, among all of the variable biological traits, seems to be the only one that *distills its own corrective.*

7. If what the determinists call "general intelligence" is either a single or multiple biological trait, it is *a priori* improbable that its general level has been essentially changed during the course of human history, or, indeed, during the long prehistoric period that elapsed between the completed evolution of man's present structure and the invention of writing. There is an abundance of empirical evidence to support this inference—for example, the superb cranial development that the Crô-Magnon race attained fully 20,000 years ago. If, as Professor Terman insists, "intellectual abilities are pretty largely determined by native endowment,"[1] it seems equally true that general intelligence took an unconscionably long time in getting into action, and the suspicion is aroused that present-day psychology is ascribing vastly more significance to nature and far less significance to nurture than the facts warrant.

This suspicion is strengthened by a mass of evidence so overwhelming in the aggregate that the suspicion rapidly grows into a conviction. If, for example, native intelligence were so superior a force as compared with culture, we should expect to find innumerable instances of discontinuity in social evolution; we should expect that superior intelligences widely separated in space and time would have "hit upon" the same improvements in

[1] Terman, L. M.: "A Psychologist's Determinism." *Journal of Educational Research,* June, Vol. VI, 1922, p. 60.

the conditions of life. As a matter of fact, the evidence points compellingly toward a continuity of culture even in prehistoric times.[1] It has clearly been the accumulation and consolidation of experiential gains that has lifted humankind from the palæolithic levels.

Again, if native intelligence were so all-important, the turning-points of social evolution would have been marked by positive variations or increases in native intelligence and these would necessarily have been widely spread among millions of individuals. This hypothesis not only involves us at once in a biological absurdity, but is clearly inconsistent with the facts. The great turning-points of social evolution have actually been marked by improved methods of disseminating experience—*of letting more light into common minds!* The invention of writing has been characterized quite without exaggeration as the greatest event in human history. It is no mere coincidence that the beginning of "modern" history was contemporaneous with the development of the printing-press in Europe. Nor is it at all accidental that the nations that today rank highest on the scale of civilization and progress are those in which a substantial form of elementary *popular* education is most nearly universal.

I am aware, of course, that efforts have been made to explain social evolution in terms of biological improvement. It is easy to say that certain countries are backward because their peoples are either biologically undeveloped or biologically decadent. Galton explained the Dark Ages on the assumption that the more competent persons of both sexes sought a celibate refuge in the

[1] *Cf.* a summary of the evidence, with citations to the monographic literature in the first supplementary volume of the *Encyclopedia Britannica*, Vol. XXX, 1922, "Anthropology," especially pp. 147 ff.

monasteries and convents, leaving the common man, the moron, and the imbecile to propagate the species. Mr. Madison Grant[1] and others have attributed all human progress to the native abilities (not exclusively or even predominantly intellectual, by the way) of the blue-eyed Nordic peoples, and have voiced a solemn warning that, unless the Nordic stock keeps its own blood pure and the "inferior" brunet peoples in a proper degree of subjugation, civilization will quickly and inevitably "go to pot." On the other hand, however, we have the now classic studies of Odin, Ward, and Cattell, emphasizing the outstanding significance of environmental factors; more recently Huntington[2] has made out a plausible case for the environmental influence of climate as a prime determinant of human achievement; developments in the field of tropical medicine seem to explain in the humbler but less fatalistic terms of the hookworm and the malaria-mosquito many defects that the determinist would ascribe to the inborn incapacity of the tropical peoples; while the possibilities of controlling some of the physiological conditions of mental development through endocrine treatment, if not as yet warranting extravagant hopes,[3] are at least sufficiently convincing to counteract the equally extravagant despair that determinism encourages.

8. The current teachings of the deterministic school are dangerous because they proceed with an apparently dogmatic disregard of the possibilities of insuring progress through environmental agencies. Take, for example, the current deterministic interpretations of the

[1] Grant, Madison: *The Passing of the Great Race*, New York 1916.

[2] In his *Civilization and Climate* (1915) and other works.

[3] See the admirable symposium on the endocrines in the *Journal, of the American Medical Association*, Vol. LXXIX, pp. 89–109, July 8, 1922.

results of the Army tests—interpretations which leave entirely out of account any possible influence of environmental factors. The fact that the median mental age of the enlisted men coincided almost exactly with the median age of leaving school is completely ignored. The higher mentality of those who remained in school is dogmatically explained as due to selection with no whit of credit given to the school.[1] Even the clear possibility that practice-effect might transfer from recent school experiences in taking examinations to the similar situation in taking the Army tests is never mentioned, although every experiment on "transfer" has taught us that practice-effect is a factor that must be reckoned with.

Why is it that factors so obvious to anyone acquainted both with the theory of the tests and with the wide variations in American educational systems were not considered before the fatalistic and fantastic interpretations were sent broadcast? Rightly interpreted, the results of the Army tests constitute a fairly clear vindication of the contentions of the environmentalists. How does it happen that quite the opposite implications have gone forth, if not with the sanction of, certainly without a vigorous disclaimer from, the responsible group? At the present juncture in social evolution it should be no light matter to promulgate under the guise of science an obviously one-sided and now apparently

[1] Professor Terman's own arguments against accepting the results of the Army tests as indicative of average adult mental age contain no suggestion that the differences found may have been due to educational inequalities. The educational factor is mentioned but in a context that shows clearly that Professor Terman is thinking of the high school and college as selective agencies. (See Terman, L. M.: "Mental Growth and I. Q." *Journal of Educational Psychology*, Vol. XII, pp. 330–331, September, 1921.)

fallacious theory the net effect of which is to weaken public faith in universal education.

9. Clearly if the possibilities of insuring progress through environmental agencies had only an equivalence of plausibility as compared with Galtonian fatalism, every consideration of humanity would compel us to accept them as working hypotheses in education. As a matter of fact, the plausibility is not equivalent, it is distinctly preponderant. Professor Terman suggests that Galtonian fatalism "is entitled to the right of way as a guide to action until something more substantial than sentiment can be brought to bear against it."[1] Whether the facts and reasoned inferences that I have adduced are more than "sentiment," the reader will be able to judge. Should he consider them sufficient only to afford a fairly even balance with the opposing facts and inferences, then I contend that sentiment should be frankly permitted to cast the deciding vote. Sentiment has not been an entirely negative force in this world of ours. It has accomplished some rather important things right in the face of the theory that Professor Terman is supporting. What, may I ask, would have been the effect of the anti-slavery agitation if the hypothesis of an unmodifiable "general intelligence" had been current at that time? What would be the case of the universal franchise? Indeed, why not hereditary leadership and even the divine right of kings if only these doctrines could be tempered with a little Mendelism? We are wont to grumble about the slowness with which science develops. Personally I am devoutly grateful that "sentiment" had an opportunity to work a few miracles before modern psychology "discovered" these innate, radical, and unchangeable differences in native mentality.

[1] *Journal of Educational Research*, June, 1922, p. 60.

10. Granting a biological basis for mentality, and granting that this basis is subject to the biological laws of variation and growth, it is my contention (*a*) that the innate variations diminish rapidly *in social significance* as we go up the scale from the idiot toward the genius, because (*b*) horizontal growth (stimulated by environmental forces) compensates in many important ways for the differences in vertical growth (due to native factors).[1] The relatively "low visibility" of the differences between the common man and the genius as compared with the differences between the idiot and the common man, has not been mentioned by any of the determinists who have been so kind as to discuss my paper. It is, I think, a crucial issue.

11. Professor Terman's assertion that the Army tests do not show any evidence of intellectual growth between the ages of 21 and 31 is worthy of attention in this connection. Reference to the report of the Army tests discloses the fact[2] that no correlations were worked out between the scores made by the enlisted men and their chronological ages. In the case of the officers, the tabulations of scores according to age show a steady decline in "intelligence" between the ages of 20 and 60. According to the official graph[3] the officers under 21 were the most intelligent of all. The officers between 51 and 60 show a deterioration of about twenty per cent from the 20-year level. The deterministic explanations

[1] Since this paper was written, careful investigations abundantly demonstrate that "horizontal" growth gives rise to "vertical" growth. (See the summary of the evidence in Ch. VII.)

[2] Yerkes, Robert (editor): "Psychological Examining in the United States Army." *Memoirs of National Academy of Science*, Vol. XV, Washington, D. C.: Government Printing Office, 1921, p. 813.

[3] *Memoirs*, Vol. XV, p. 814.

of this apparently progressive deterioration of intelligence with age illustrate admirably the inevitable tendency of deterministic thinking. The obvious explanation (which the determinist studiously avoids) is that the Alpha tests are tests of education, and that, in consequence, the younger officers, being closer to their school days, did far better on the tests than did the older officers. It is possible, too, that the improved schooling of the past few decades has helped the younger officers. Even to suggest this, however, would be impossible to the dyed-in-the-wool determinist. All differences *must* be due to "selection" if the hereditarian hypothesis is to be upheld—consequently all other possibilities are rigorously excluded!

12. Professor Terman does not like my "naïve" definition of democracy as the collective supremacy of the common man. Nor do some other people. I did not formulate this definition as an ideal, but as a fact—and a most tremendous fact fraught with a most tremendous meaning. Professor Terman implies that the collective supremacy of the common man is inconsistent with the facts of biology and psychology. If so, a big fact is in conflict with some little facts. As I have suggested, practically every great forward movement in social evolution has been made in the very face of the theory for which Professor Terman stands. Each of these movements has tended toward the liberation of the great masses and the assumption by them of larger and larger measures of power. After studying this development with apparent justice from every point of view, Lord Bryce concluded that democracy, even in this "naïve" sense, had abundantly justified itself. The big fact seems to have swallowed and digested the little facts, and theories based on the latter and utterly disregarding the former would consequently seem to

have now only an academic interest. Professor Terman wishes to formulate a definition of democracy that will "square with the demonstrable facts of biological and psychological science" (p. 62). I admire this ambition of the determinists to set an example of clear thinking. Is it unkind to suggest that their own field fairly bristles with opportunities for practice? Democracy, as the collective rule of the common man, seems likely to get on fairly well for a while with its present definition; but a good, sound, clear definition of "general intelligence" that will "square" with common-sense, everyday experience, and the facts of history is very saddly needed.

13. Such a definition, if happily achieved, might do something to clarify the determinist's conception of "leadership" and the alleged responsibility of the school to select potential leaders and equip them for social service. Professor Terman says that I would consider it "most undemocratic to remind a class of college graduates that they are marked by ability and training for leadership." Quite so; I would rather tell them that they owe to society a debt of *service* in return for the privileges and advantages that they have enjoyed. Leadership in any sense of the term they may or may not achieve, but positive service of some sort they can all render. It is, indeed, the verdict of human experience that the less they have their eyes on the "distinctions" and "prominence" that the term "leadership" so inevitably implies, the greater will be their chance of becoming effective leaders in a democratic society. Nothing is more inimical to such leadership than an over-weening consciousness of one's superiority to the common run of humanity. This negative and "inferior" trait, it seems, more than counterbalances the traits, however numerous, that are positive and constructive.

Certainly a striking characteristic of the very leaders[1] whom Professor Terman names is their humility—their sincere humility, not a posed substitute. In my judgment, neither social progress nor individual happiness will be augmented by encouraging young people to believe that they were born to lead. With individuals as with nations, the superiority-complex seems to be heavily charged with dynamite.

14. If it is desirable that there should be more high I. Q.'s among our effective leaders, the best way to get them, I contend, is to educate the rank and file justly to evaluate and select them rather than to imbue these gifted children with the notion that they have been Heaven-sent to lead their dull fellows. Professor Terman accuses me of confusing "leadership" with "drivership." Well, whether the common man follows blindly or is blindly driven seems to me quite inconsequential. It is the tacit and nonchalant assumption of necessary and irremediable blindness that I am calling into question. It is my contention that the common mind of humanity has already demonstrated its ability to think for itself; that universal education can train it to think more clearly and in larger units—in any case, that universal education can give it a common stock of dependable ideas with which to do its collective thinking —and that the first and foremost task of education is to do this job passing well.

I should be remiss if I were to close this paper without again stating my conviction that mental tests have made very important contributions to educational progress. It would be the height of folly for education not to avail itself of these instruments for detecting individual dif-

[1] In his paper, Professor Terman refers to Luther, Shakespeare, Darwin, Pasteur, Blackstone, and others.

ferences in learning capacity,—whether such differences be innate or acquired. *My quarrel is not with the tests, but with the fatalistic assumptions which are part of their "heredity."* They derive from Galton, and they are overburdened with Galtonian tradition. The present-day determinists repudiate some of Galton's teachings. One in particular is to them anathema, although it seems to me far worthier of survival than others that they retain. I refer to Galton's theory that genius is eminently well qualified to look after itself—that it is bound to come into its kingdom in spite of almost every obstacle short of premature death.[1] I have a suspicion that Galton came pretty close to the truth here. On the other hand, there is the great rank and file of common or average intelligence. To endow the masses with genius is biologically impossible; but to endow the masses with the fruits of genius is both educationally possible and socially most profitable. The mental tests will help most if they aid the teacher in discharging this transcendent duty. They will render a gratuitous and disastrous disservice if they encourage in the teacher the conviction that the illumination of common minds is either an impossible or a relatively unimportant task.

[1] Galton, F.: *Hereditary Genius.* London, 1869, p. 35.

CHAPTER III

THE CRITICAL PERIOD FOLLOWING THE WAR AS A TEST OF UNIVERSAL EDUCATION

It is since the World War closed that a radical skepticism of the influence of education has been most clearly revealed. When the Allies and their associates girded up their loins to crush the imperialistic ambitions of the Central Powers, it was the safety of democracy and of democratic institutions that became the rallying cry. When the German autocracy finally admitted its defeat it was but a natural assumption that this rallying cry had been sincere; that the promises for which billions of treasure had been expended, and for which millions of lives had been sacrificed, would be speedily redeemed; and that an enlargement and extension of the democratic principle would be the immediate outcome of victory and peace.

Seldom if ever in the long course of history have lofty aims and unselfish aspirations crumbled so quickly. The signatory ink on the Armistice pact was scarcely dry before reaction set in. As long as the guns roared on the Western Front, nothing was too good for the common man, whether he was in the trenches, or on the transports and supply-ships, or in the essential industries at home; but when no sooner had the echoes of the last gun died away than the rallying cry of democracy lost much of intensity and far more of its sincerity. The loss has been progressive every since.

The deterministic theories came into prominence early in this critical period of doubt and reaction. They found a ready acceptance among many a staunch patriot of aristocratic proclivities who had undoubtedly vociferated the war-slogan of Democracy with his tongue in his cheek (if vociferation under such anatomical conditions be physiologically possible). They found equally ready acceptance among the rich whose margins of opulence were threatened by the continuation of the war-taxes and who were not unnaturally apprehensive of what might happen if a victory for democracy meant more "welfare" legislation. They found perhaps a more reluctant but no less effective acceptance among many sincere democrats who, viewing from a distance the Russian *débacle*, decided that if democracy meant this sort of thing they had been worshiping at the wrong shrine.

There is little wonder, then, that determinism of the hereditarian variety has spread far beyond academic circles. At first the "highbrow" magazines took it up; then the widely-read weekly journals. Books like those of Lothrop Stoddard have had a wide vogue, and the theory of Nordic supremacy is now a commonplace. The popular novelist, ever sensitive to the *Zeitgeist*, has added fuel to the fire. Sinclair Lewis portrays "Babbitt" as the consistent outcome of democratized opportunity: a graduate of a State university, and yet a man of coarse speech, of commonplace interests, of ambitions dictated entirely by the fashion of his crowd, and of indecent cravings covered by a conventional cloak of morality until they had a chance for gratification under conditions where "getting caught" was unlikely. And how, insinuates the author, could it be otherwise since "Babbitt" had behind him a hundred generations of peasant ancestry? The peasant

had achieved soap, bathtubs, a safety-razor, clean linen, eight thousand dollars a year, and an automobile, to say nothing of a university education,—but he was still a peasant and without a peasant's virtues!

It is this growing skepticism of education, this subtle but effective denial of the power of education to work fundamental changes, that constitutes the grave peril in the deterministic philosophy. If the philosophy were tenable, if it had the unequivocal support of scientific evidence, there would be no alternative, of course, but to accept it. But it does not have this support; indeed the evidence, as the following pages will abundantly demonstrate, is overwhelmingly against it. Determinism has gained a specious validation through a plausible setting forth of half-truths. Men and women have accepted these fifty per cent facts at one hundred per cent value—in part because the banks that issued the currency seemed to be trustworthy, and in part because the currency itself (like nicely engraved banknotes) was to many of them intrinsically attractive. They have used these fifty per cent facts in their business of thinking. In general, there has been nothing wrong with their bookkeeping—nothing wrong with their reasoning. The fault has lain in an unsound currency—in unsound data. In view of the implications of these data, the readiness with which the "man in the street" has drawn perfectly logical inferences from them is in itself fairly good evidence of their unsoundness. The "common man" seems after all to be a reasoning animal—even drawing the logical inference that he is not and never can be a reasoning animal when this conclusion is supported by apparently trustworthy evidence!

It may be objected, of course, that the common man, before drawing any inferences whatsoever, should apply

an acid test to the data, and that his failure to do this stamps him as irrational. But if this be the criterion, he can point to a number of indisputably uncommon men and women, presumably quite rational, who have failed to make this test. Both the technical and the popular literature of determinism supply abundant examples. College and university presidents (prompted, no doubt by the increasing difficulty of caring for the hordes of students that the democratic high schools are sending to them) have been among the loudest to proclaim the futility of mass-education, and in so doing have shown an illuminating readiness to accept half-truths at full value. Here are some extracts from the inaugural address of a college president as reported by the daily papers in the fall of 1922:

"The mental tests recently made on one and three quarters million men in the United States Army showed us not only inequality but revealed larger proportions in the extreme classes than we thought possible. With only 13½ per cent of the population able to get through college well, 15 per cent able to get through at all, and 25 per cent able to comprehend the significance of the ballot, democracy is out of the question . . .

"It may be a wise course to treat the people like children and let them play at governing themselves, but would it not probably be as wise to recognize the truth? The play goes on until a problem arises and then we call for a leader. What we mean, of course, is a ruler. The ruler thus called rules autocratically, curing the period of difficulty, and then lets us play again . . .

"The melting-pot figure has been incorrectly interpreted. There is no alchemy in the melting-pot. Some apparently thought that, if we put gold and silver and copper and iron into the pot, the product of the furnace would be gold. We find that we did not get rid of an ounce of iron. In fact, we find after a few generations more iron and less gold."

That this specific college executive even "checked" his alleged facts is inconceivable. He was apparently swept off his feet by someone's guess that "only 13½

per cent of the population can get through college well" and that only 15 per cent are able to get through at all. He then inferred from these apparently low per cents that "democracy is out of the question." Here not only are the data most uncertain, but the inference reveals an amazing ignorance of other data that a man in a responsible position might well be expected to know before committing himself with this cocksure definiteness. If 15 per cent of the population ever have a chance to get through college, we shall have to increase our present college facilities at least fivefold. So why despair of democracy yet—except as we may entertain a fear that college executives of a certain type may also increase fivefold!

More fundamental than the skepticism of democracy expressed by such men and women as we have referred to is the academic cult of pessimism, of which numerous exponents may be found in the fields of scholarship that deal specifically with human problems,—history, sociology, anthropology, and psychology. It is the fixed idea of this cult that there has been no demonstrable progress in the human race since the dawn of history or even since that far more remote time when the present biological characteristics of the species became fixed. A typical expression of this attitude may be found in Carveth Read's interesting treatise, "The Origin of Man and His Superstitions."[1] Mr. Read, an English psychologist of high standing, presents in this book an illuminating study of the conditions under which the genus *Homo* became differentiated from the generalized anthropoid type that all students of problem agree must have been man's immediate progenitor in the animal series. We need not be detained here by Mr. Read's ingenious theory that the human race evolved from *Lycopithecus*, an hypothetical

[1] Read, Carveth: *The Origin of Man and His Superstitions.* Cambridge (England): The University Press, 1920.

wolf-like ape that was forced by environmental conditions to leave the forest and roam the plains in packs. Our present interest is in the amazing conclusion[1] that pops down on the reader, apparently out of a clear sky, at the very close of 344 pages of fascinating speculation:

"Natural selection . . . has operated first in producing variability; and all tribes, even the lowest, produce relatively eminent men. The average intelligence or ability of the crowd, in which individuality is liable to be lost, is much less important. The result is that each nation has its military affairs, organization of industry, science, invention, literature, and art provided for it by a small number of citizens; the rest fill the ranks and learn what they are taught. Thus arranged, the leading nations have of late years made wonderful progress in science and in everything that can be done by machinery; but there is no reason to suppose that anything has been done toward raising the average intelligence and character; and in default of that, in my judgment, nothing has been done to advance civilization. The world is no safer against war, revolution, demagogy, despotism, degeneration. The greatest improvements have been made in means of destruction; next we may put the invention of flying machines; and their chief use has been destruction. Destruction now pauses, not because the antagonists are satiated; they are only exhausted; and there is more hatred in the world than was ever known before. How then shall we judge of things to come?

"Speaking of the average man, we usually think of the European and North American average; but in considering what changes may be expected in the world, the people of India (300,000,000), China (350,000,000), and the millions of the rest of Asia, the Eastern Archipelago, and South America cannot be left out; and to include them does not raise the average. What will be their contribution to history? There are two rational proposals for raising the average, namely, eugenics and deliberate elimination of the unfit; and there are 1,500,000,000 on whom to operate.

"Anyone who anxiously desires to foresee the future of our race is in a position to sympathize with the ancients. Go, inquire at Delphi or Dodona; or sleep in Stonehenge, or at the tomb of Merlin, or by the barrows of Upsala, and dream of things to come; or consult the stars, cast the nativity of *Lycopithecus*, and read in

[1] Read: *Op. cit.*, pp. 343 ff.

heaven the fate of his posterity. If these methods are not very hopeful, any one of them is as good as guessing. The only safe reflection is that he who lives longest will see most."

Here is a frank expression of the academic pessimism which follows as a corollary from the hereditarian hypothesis. "Nothing has been done toward raising the average intelligence: and in default of that . . . nothing has been done to advance civilization." That there can be no progress except biological progress is a perfectly legitimate position to take provided that one is careful to define one's criteria—and then stick to the definitions. Otherwise, of course, argument is futile. Fortunately Mr. Read has set forth his criteria: mankind, he asserts, is no safer from the perils of "war, revolution, demagogy, despotism, degeneration" than in the days of *Lycopithecus*. These seem to be fair standards by which to test the forces of social evolution as compared with the forces of biological evolution. Has civilization improved mankind in the light of these criteria? Or, to put the question in a more specific form, Has universal education (which we may assume to be a primary factor of social evolution) exerted such an influence? Has mass-education "raised the average intelligence" as measured by these very definite standards?

Unfortunately we cannot go back to the days of *Lycopithecus* to get data for our comparisons, but it is possible to make a fairly accurate estimate of the influence of mass-education in somewhat more recent times. Let us take, for example, the criterion of civilization and average intelligence which Mr. Read defines as "safety from revolution." The critical years through which the European nations passed immediately after the World War furnish an unprecedented test of "social stability." These nations have varied widely in the provisions that they have made for mass-education. Let us see whether

during this period they have varied in social stability in direct proportion to their earlier variations in providing for the education of their people.

It is possible to construct a rough but reasonably accurate "educational index" for each of the European nations by taking the per cent of the total population that was enrolled in the elementary schools of the country prior to the World War. It would be better, of course, if we could go back to 1880, 1890, and 1900, but unfortunately reliable data are available for only a few of the nations for these decades. Comparable figures for 1910, however, can be obtained,[1] and in most cases these may be taken as indicating the relative rank of the nations in respect of education at the time when the present dominant generations were of school age.

It seems fair to treat the several nations in groups, for the after-effects of the war in the victorious nations are scarcely to be compared with the after-effects in the defeated nations; neither of the two groups can be justly compared with the neutral nations; and the new nations formed from the dismembered empires of Germany, Austria-Hungary, and Russia obviously demand separate treatment. Within each of the four groups, however, the comparisons would seem to be fair and equitable. As an index of social stability, we shall take the relative freedom of these nations from internal dissensions during the three-year period from November 11th, 1918, (marking the virtual close of the

[1] These figures will be found in the "Report of the United States Commissioner of Education," Washington, 1913, close of Vol. I. These I have checked with per cents tabulated from the "Statesman's Yearbook" (1911 and 1912), and with the school-enrollment figures given for some of the countries in the articles on these countries in the "Encyclopedia Britannica," 11th edition, 1910. With a few unimportant alterations, I have used the data found in the Report of the United States Commissioner.

War) to January 1st, 1922. As a symptom of social instability or internal dissension, we shall use the frequency of actual revolutions. Except Germany and Austria-Hungary, however, the better educated nations had no real revolutions; hence, to give Mr. Read's theory every chance of justification, we shall also accept as evidence of internal dissensions those cabinet-crises that resulted in a change of ministries.

Now for the comparisons. Let us take first the neutral nations. With respect to the emphasis that these nations gave to elementary education before the War as indicated by the per cent of the total population enrolled in the elementary schools about 1910, the order was as follows:

Norway	15.7 per cent
Holland	15.4 per cent
Switzerland	14.4 per cent
Sweden	14.3 per cent
Denmark	13.6 per cent
Spain	10.4 per cent

None of these six nations underwent a revolution during the three critical years in question. The first three (Norway, Holland, and Switzerland) did not have a cabinet-crisis resulting in a change of ministries. Sweden had one cabinet-crisis; Denmark, one; Spain, five. Here the parallelism constitutes that rare condition called a "perfect correlation" which is as dear to the statistician's heart as the possession of a perfect no-trump hand to the bridge-player's.

The belligerents on the side of the Allies may be considered next. Their pre-war rank in elementary education was as follows:

England	16.7 per cent
France	14.2 per cent
Belgium	12.5 per cent
Greece	9.3 per cent
Italy	8.6 per cent
Rumania	8.4 per cent
Portugal	5.0 per cent
Russia	3.0 per cent

Of these countries, England, Belgium, and Portugal passed through the three post-war years in the best shape as measured by our criterion of social stability, but Belgium had the advantage of a first lien on reparations, while Portugal was virtually under an English protectorate. France had three cabinet-crises; Italy had three and was more than once on the verge of actual revolution; Greece and Rumania both had most troublous times; and Russia, by far the least enlightened of all, experienced revolutions and counter-revolutions on a scale that is without a precedent in history. These facts do not look well for Mr. Read's theory.

The Central Powers, notwithstanding their crushing defeat, tell essentially the same story. In spite of the narrowness of German elementary education under the old régime, there can be no doubt that its thoroughness and its universality were important factors in saving Germany from the total collapse that befell Russia. Austria, somewhat below Germany on the pre-war educational scale, had a much harder time of it in the three years immediately following the Armistice.

Hungary was a little better off because of her separation from the Empire. Bulgaria, the most advanced educationally of the Balkan countries, had her troubles, but they were apparently little worse than those of her less literate neighbors who were on the winning side. What was left of Turkey existed by the tolerance (not

to say intrigue) of the victorious nations. The educational scale of the Central powers before the War was as follows:

Germany	16.3 per cent
Austria	15.3 per cent
Hungary	14.0 per cent
Bulgaria	10.0 per cent
Turkey	No data

One of the most striking evidences of what universal education will do for a people comes to light when we compare the new nations formed from the old empires. The nation of Central Europe that made by far the best record for social stability and progress immediately following the war was Czechoslovakia. Of the four former provinces that are now united in Czechoslovakia, three—Bohemia, Moravia, and Silesia—were saturated with the traditions of the Moravian bishop, Comenius, whose name is among the most illustrious in the history of modern education. These provinces constituted the most enlightened part of the old empire outside of Austria, illiteracy being practically nonexistent. The position of Czechoslovakia during the period under discussion (and since that time, for that matter) may be profitably compared with the position of Yugoslavia, which was formed from the union of Serbia and Montenegro, two of the most backward nations of Central Europe educationally, with Croatia, Slavonia, Dalmatia, Slovenia, Bosnia-Herzegovina, and other smaller units, almost equally unenlightened.

Another interesting and instructive case is that of Finland. In the face of serious obstacles interposed by the Russian government, the people of Finland for a generation before the War had maintained a fairly effective system of elementary education. The harvest was

reaped in the fateful years following the Russian collapse. With Red revolution flaming at their very door, the Finns kept up an orderly and efficient government and gave evidence of a measure of social stability far surpassing that of Poland which was similarly situated but which lacked the assets that apparently only good elementary schools can provide. The peoples comprising these new nations held approximately the following stations on the educational scale in the pre-war year:

Czechoslovakia	15.3 per cent[1]
Finland	10.1 per cent
Poland	8.8 per cent[2]
Yugoslavia	4.8 per cent[3]

In a very striking fashion, then, universal elementary education and social stability are found to go hand in hand. Whether the world is any safer from "war, revolution, demagogy, despotism, degeneration" than it was in the days of *Lycopithecus* is an interesting academic question. Knowing so little of the conditions that prevailed in that remote era, one may perhaps be justified in basing a working philosophy upon more recent conditions, and here the facts demonstrate clearly enough that enlightened peoples are far safer from revolution, at least, than are unenlightened peoples.

There are still left four of Mr. Read's criteria: war, demagogy, despotism, and degeneration. The case for education is clear enough in so far as demagogy and despotism are concerned. All that one needs to do is to compare on the educational scale the nations that passed through the post-war crisis under relatively stable

[1] Austria's pre-war index (probably somewhat too high for the provinces now comprising Czechoslovakia).

[2] Average of Germany's, Austria-Hungary's, and Russia's pre-war indices (undoubtedly too high for the parts of these empires now comprising Poland).

[3] Serbia's pre-war index.

parliamentary governments and the nations that had to submit to the autocratic rule of the demagogue or the despot. Where do you find your Lenins and your Trotskys and your Mussolinis?

The relation of universal education to the peril of war is less clear because it is complicated by the factor of nationalism and the international competition for economic advantage, and yet if we take as a measure merely the number of international wars that the different European nations have engaged in during the past seventy-five years (or during the period covered by the development of the elementary school), the balance is decidedly in favor of the enlightened peoples as the more clearly disposed toward peace. The sharpest contrast, of course, is between such enlightened nations as Holland, Switzerland, Denmark, Sweden, and Norway on the one hand, and such educationally-backward nations as Italy, Greece, and the Balkan countries on the other hand.

Mr. Read's final criterion,—degeneration,—suffers from the fact that national degeneration has never been defined and in the absence of definition anything like an accurate measure is out of the question. The European nation most frequently regarded as decadent is Spain. How much truth there is in this indictment, we do not venture to guess; but if the charge be true, it is also true that Spain has never very seriously considered universal education as a cure.

There is one further measure that may be taken, perhaps, as a symptomatic index of all of the criteria to which Mr. Read refers; namely, economic stability. For this there happens to be a very sensitive measure. During the critical post-war period, practically every nation in the world greatly augmented its volume of paper money. The exchange-rate at which a nation's

TABLE 1

	Exchange-rate index, 1922	Rank	Educational index. ca. 1910	Rank
Entente Belligerents:				
England	89.3	1	16.7	1
France	43.4	2	14.2	2
Belgium	40.7	3	12.5	3
Italy	25.1	4	8.6	5
Greece	17.2	5	9.5	4
Portugal	4.0	6	5.0(?)	6
Russia	0.0	7	3.0	7
Central Belligerents:				
Germany	0.013	1	16.3	1
Hungary	0.002	2	14.0	3
Austria	0.001	3	15.3	2
Bulgaria	?	?	10.0	4
Turkey	?	?	?	?
New European Nations:				
Finland	12.0	1	10.1	2
Czechoslovakia	11.0	2	15.3(?)	1
Yugoslavia	2.0	3	4.8	4
Poland	0.0004	4	8.8(?)	3(?)
European Neutrals:				
Switzerland	99.9	1	14.4	3
Sweden	95.5	2	14.3	4
Holland	94.1	3	15.4	2
Denmark	81.6	4	13.6	5
Spain	80.1	5	10.4	6
Norway	64.4	6	15.7	1
Non-European Nations:				
United States	100.0	1	17.5	1
Canada	96.9	2	16.6	2
Japan	96.4	3	13.2	3
Argentina	85.5	4	10.7	4
Uruguay	77.5	5	7.8	6
Chile	69.5	6	10.5	5
Brazil	20.7	7	3.0	7

currency was valued in the world's markets at that time forms an unusually sensitive index of its "risk" from "war, revolution, demagogy, despotism, degeneration," and a host of other perils. It is interesting to note how closely relative freedom from this risk paralleled the prior development of elementary education in the important nations of the world. In the foregoing table, the "Exchange-rate index" is based on the market-value on the New York exchange in 1922, of each country's currency proportioned to par-value. (For convenience, the mean between the extremes during the period January 1st to October 22d was taken as the index.) The "Educational index" represents the per cent of total population enrolled in elementary schools for the year 1910 (or the year nearest that date for which the figures are available).

The above comparisons, while perhaps not so impressive as are those based on social stability as measured by the relative freedom from internal dissensions, are scarcely less significant. Indeed, if all of the nations in the list be considered on the same plane (that is, without grouping), the correlation between the exchange-rate ranking and the educational ranking yields the Pearson coefficient, 0.53, which is just about the physical resemblance that has been found to exist in the average of cases between brothers. If the defeated nations of Central Europe be omitted, the degree of resemblance between the two rankings is increased to 0.71, and if the "new nations" be also omitted, the coefficient becomes 0.76,—or almost as high a degree of resemblance as that which exists in the average of cases between twins.

We come now to the stock argument of the hereditarian when confronted by comparisons of this sort. Resemblances in rank-order do not necessarily mean the existence of causal factors. Even though the

countries that had good schools a generation ago are now demonstrably safer countries to live in than are the countries that neglected schools, it does not necessarily follow, of course, that the schools had anything to do with the present situation. The happy outcome may be merely accidental. The probability of this, however, is reduced to the vanishing point when the resemblances are so close and consistent as those that we have been considering. There is still the possibility that other factors have been at work to cause the resemblances. The determinists quite naturally choose heredity as the causal factor. Certain nations have better "stock" than other nations, they say; and this means that these favored nations will both have better schools and make a superior record in respect of social stability or any other collective virtue for which a measure is available.

There is an important test that can be applied to this hypothesis in connection with the data that have been set forth. We have found a close resemblance between past provisions for universal elementary education and present-day social stability. Let us assume for the moment that this parallelism does not involve a causal relationship between elementary education and social stability; let us assume that resemblances are rather concomitants of a third factor, and let us call this factor heredity. Now if these assumptions be correct, at least an equal degree of parallelism should exist between provisions for secondary and higher education and social stability, for in all countries, institutions of the latter type are essentially schools for the better classes. Indeed, the resemblance should be much closer here if the hereditarian hypothesis be valid, for, as Mr Read says (reasoning apparently from this assumption), "the average intelligence of the crowd . . . is much less important" than the intelligence of the "leaders."

As a matter of fact, however, the correlation of secondary and higher education with social stability is not nearly so close as the corresponding correlation for elementary education;[1] and the reason is clear. Many nations that have neglected mass-education have provided liberally for the education of "leaders." The excellent *Gymnasien* and universities of Russia, as was pointed out in the preceding paper, did not save Russia in her critical hour. According to the figures reported in the "Statesman's Yearbook," Italy in 1906 had proportionately more students in secondary and higher institutions than England, France, or Sweden, and Belgium surpassed all European countries except Switzerland and Denmark. Secondary and higher education are important, but they clearly do not have the basic and fundamental influence that the elementary education of all the people exerts.

If there is a more trustworthy index of a nation's place on the scale of civilization and progress than the attention that it gives to mass-education, the present writer has been unable to discover it after a fairly prolonged search. Indeed, is there any factor that can be more safely employed in predicting a nation's future, or any factor that could, with as much justice, be taken as a fundamental standard in determining our own immigration policies? In international relationships, is there

[1] If one takes the nations of Europe listed on p. 60 and, in place of the "Educational index" based on the per cent of elementary-school to total population, computes in the same way the proportionate enrollment in secondary and higher institutions, the correlation with the "Exchange-rate" index of social stability is found to be only 0.44 as against 0.76 for the former comparison. (The Central belligerents and the "new nations" are omitted in both comparisons.) The enrollment figures for secondary and higher education are from the *Statesman's Yearbook* for 1906 or the year nearest to that date for which the information is available.

any type of information upon which a nation should be informed regarding its neighbors that would have a more fundamental significance than information about their policies, plans, and programs of universal elementary education? What attention did the statesmen of other countries give to the German *Volksschulen* before the war?—for that matter, what attention are they giving now to the powerful and pervasive force which the elementary schools of every great nation represent? Every embassy and legation has its military and naval attachés, but so far as we are informed, only one nation has ever attached an educational representative to its foreign legations.[1]

Mr. Read, it will be remembered, advised those who would foresee the future of our race to "inquire at Delphi or Dodona; or sleep in Stonehenge, or at the tomb of Merlin; or by the barrows at Upsala, and dream of things to come." Less romantic, perhaps, but infinitely more informing and profitable, would be a short journey to the nearest elementary school and a half day spent in seeing what devoted teachers can do with even unpromising descendants of *Lycopithecus*. It is true that we may not be safe as yet against the perils of "war, revolution, demagogy, despotism, degeneration"; but if the contrasts drawn in the preceding pages mean anything, they clearly mean that there is one way of widening the margin of safety,—one way well within the control of civilized society. That one way is through the extension and improvement of mass-education. Why "cast the nativity of *Lycopithecus* and read in heaven the fate of

[1] We understand that Czechoslovakia had an educational attaché with its Washington legation for a few years following the War. The policy of having educational attachés at American embassies and legations was incorporated, at the present writer's suggestion, in the Education Bill sponsored by the National Education Association.

his posterity" when that fate is pretty clearly within our own hands? "The only safe reflection," dolefully concludes Mr. Read, "is that he who lives longest will see most." The only *sane* reflection, we venture to suggest, is that he who works hardest for the common good, whether his life be long or short, will be doing his mite toward making the future worth while for those who live in it.

CHAPTER IV

DO GOOD SCHOOLS PAY?[1]

It is the purpose of the present paper to bring together the outstanding facts from several sources in an effort to determine through a comparison of American commonwealths whether an investment in education actually pays dividends that can be spread on a balance-sheet. It is proposed to check the relative efficiency of public schools a generation ago against the intelligence and efficiency of present-day adult populations that are presumably the products of these schools.

The difficulties and dangers that such a comparison involves are obvious enough. A few of them may be briefly referred to here at the outset. The results of the Army intelligence tests form one source of our data. It may be objected that these are tests of "native" or "inborn" intelligence and that the results of the tests have in no way been affected by schooling. My reply is, first, that the inference that the test-scores were not affected by schooling is open to very serious question as I shall demonstrate presently; and, secondly, that, if the scores should turn out to reflect native intelligence uninfluenced by schooling, then the results must certainly

[1] In its original form, this paper was presented at the Schoolmen's Conference of Ohio State University, May, 1923, and published in the *Journal of the National Education Association*, June, 1923. The statistical data have since been revised and expanded to include certain measures that were not available when the paper was first prepared.

be considered in projecting an educational program for the Nation.

Another difficulty in any attempt to trace present conditions back to the schooling provided in the past lies in the very mobile and otherwise unstable character of our population. Not only do large numbers of our people migrate from state to state, but a substantial proportion of the population in many states is of alien birth and breeding. Certainly neither the virtues nor the shortcomings of migrant adults can be attributed to the schools of the states in which they happen now to live. This source of error I have attempted to correct in a way that will be described later.

A third difficulty lies in determining the educative influence of agencies other than public schools, but this, as I shall point out, is not an entirely insuperable obstacle.

A fourth difficulty is the possible influence of climatic conditions on intelligence, character, and efficiency, and this in the main I shall have to disregard for the present.[1]

I

Let us start, then, with a comparison of the several states on the basis of their present levels of general intelligence as indicated by the results of the Army tests. Mr. H. B. Alexander, in *School and Society* for September 30, 1922, presented a ranking of forty-one States according to the median scores made by their contingents of *white* troops on the Alpha tests—that is the tests given to the white soldiers who could read and write English. Seven States were omitted by Mr. Alexander because of the relatively small number of

[1] The geographical factor will be more thoroughly discussed in Ch. V.

TABLE 2.—COMPARISON OF FORTY-ONE STATES AS TO MEDIAN SCORES MADE BY WHITE RECRUITS IN "ARMY ALPHA," WITH THE RANKS OF THE SAME STATES IN SCHOOL EFFICIENCY IN 1900 (AYRES' RATINGS, ALL TEN COMPONENTS)

State	Median Alpha score	Rank in intelligence (1918)	Rank in school efficiency (Ayres, 1900)
Oregon	79.9	1	26
Washington	79.2	2	12
California	78.1	3	3
Connecticut	73.6	4	4
Idaho	73.5	5	29
*Utah	72.2	6	9
*Massachusetts	71.6	7	1
Colorado	69.7	8	6
Montana	68.5	9	8
*Vermont	67.5	10	18
*Ohio	67.3	11	10
*Maine	67.0	12	25
Nebraska	66.2	13	15
*Pennsylvania	65.1	14	13
*New York	64.5	15	2
*Iowa	64.4	16	21
Minnesota	64.0	17	19
Kansas	63.9	18	28
*Illinois	63.8	19	11
*Michigan	63.3	20	16
Rhode Island	62.9	21	5
*New Hampshire	61.9	22	24
*Missouri	59.5	23	27
South Dakota	58.3	24	23
North Dakota	57.1	25	20
*Wisconsin	56.5	26	22
*Virginia	56.3	27	34
*Maryland	56.2	28	17
*Indiana	56.1	29	14
Oklahoma	52.5	30	32
*Texas	50.9	31	31
New Jersey	48.7	32	7
*South Carolina	47.4	33	39
*Tennessee	47.2	34	33
*Alabama	46.3	35	40
*Louisiana	45.2	36	35
*North Carolina	43.2	37	41
*Georgia	42.2	38	36
*Arkansas	41.6	39	37
*Kentucky	41.5	40	30
*Mississippi	41.2	41	38

For the 41 States:
Correlation coefficient, r + 0.72
Probable error, 0.05
* For 26 States with 55 per cent or more of population native to state in 1910:
Correlation coefficient, r + 0.818
Probable error, 0.045

recruits from these states in the camps where the tests were given.[1] Except West Virginia and Florida, these omitted States are those of relatively small population. Table 2 shows the distribution. Of the forty-one states considered, Oregon stands first with a median score of 79.9; Mississippi has the lowest rank with a median score of 41.2.

This is by no means an inconsiderable difference. If the Army draft of white soldiers be considered as a typical cross-section of the adult white population, the median white citizen of Oregon has an intelligence approximately equal to that of the average person engaged in clerical occupations, while the median white citizen of Mississippi is on the intelligence-level of the average unskilled laborer. Or, to put it in another way, if the Army tests are reliable measures of native intelligence, the median white citizen of Oregon has better than a normal adult mind, while the median white citizen of Mississippi ranks so far below the accepted norm that I hesitate to give the name of the group in which he would fall. *From the standpoint of a Federal democracy made up of equal commonwealths, this difference is not a gap; it is a chasm.* It becomes of the very greatest importance, then, to know whether this difference is due solely to native or inherited factors, or whether, in part at least, it is explicable in terms of educational opportunity and other forms of environmental stimulus. If the former is the case, then the outlook for the future is pretty black; if the latter is the case, then there is still some hope, for we may be able to take part of the energy that has been so freely expressed in bemoaning the "low intelligence" of the American people and direct it toward the improvement of the public schools.

[1] Only states for which data for at least five hundred soldiers were available were used in Mr. Alexander's comparisons.

In order to gain some light on the crucial question as to whether the Alpha scores are affected by schooling, Mr. Alexander took the rank-order of these forty-one states as to their median Alpha scores and compared it with the rank-order of the same states as represented by the Ayres school-ratings for 1900, a year when most of the men who took the Alpha tests were in the elementary school. He found between these two rankings a general agreement represented by the Pearson coefficient[1] 0.72, with a probable error[2] of 0.05. He also made other distributions representing the operation of environmental factors other than schooling, and reached the conclusion that "in so far as it applies to such large social groups as the American states, Army Alpha appears as a test of what *has* been learned rather than of what *can* be learned."

An even stronger conclusion is, I think, justified by these comparisons. An examination of Table 2 will show that the resemblance between the intelligence-rankings and the school-rankings, while impressive, might be even closer if we could account for the migrant population. The two states that stand highest—Oregon and Washington—did much better in the Army tests than their school ratings in 1900 would lead one to expect. They are both states that have had large influxes of new population during the past twenty-five years. It is possible that these newcomers migrated from other states and from

[1] A perfect agreement would be represented by the coefficient 1.00; the lack of any resemblance whatsoever, by the coefficient, 0; a perfect disagreement, or "inverse" correlation, by the coefficient, −1.00. Correlations of 0.70 and above are usually rated as high.

[2] The "probable error" represents the range within which the coefficient would be likely to fall if a very large number of cases were considered. A coefficient should be at least four times its probable error to be considered significant.

foreign countries which were much better off educationally a generation ago than were the states in question, and that the superior standing of the two states is due in part to this fact. There are certain states, also, that make a relatively poor showing on the tests; they fall below the expectancy that their school-ratings of 1900 seem to justify. The most notable examples are Rhode Island and New Jersey. These states also have been receiving large accessions of population within the past generation. It is possible that the newcomers here grew up in states or foreign countries that were educationally less well-circumstanced in 1900 than were Rhode Island and New Jersey.

An examination of the census report for 1910 confirms our prediction almost to the letter. Oregon and Washington (and Idaho as well, which also greatly surpasses its "expectancy") received their new population in an overwhelming measure from states that stood relatively high on the school-scale for 1900, and from English-speaking foreign countries in which the schools a generation ago were comparable with those of the best American states—notably England, Scotland, and the English-speaking provinces of Canada. Rhode Island and New Jersey, on the other hand, had large influxes of population from states less well-circumstanced a generation ago than they, and especially from non-English-speaking foreign countries which had the added disadvantage of very meager school facilities.

In the light of these facts, it would be safe to predict that, if we took only those states in which a clear majority of the total population is native to the state, we should find the resemblance between the intelligence of the adult population and school conditions a generation ago very much closer than was revealed in the forty-one

states that Mr. Alexander studied. Of these forty-one states, there are twenty-six, in each of which, according to the census of 1910, at least 55 per cent of the total population was born in the state. Now when we compare the median Alpha scores of these states with their school-ratings for 1900 we find that our prediction is notably fulfilled. In spite of the reduction in the number of cases, which ordinarily operates to reduce such resemblances, we find the correlation increased by ten points,—from 0.72 to 0.82, or twice the probable error.[1]

In taking only the states in which a clear majority of the adult population is native to the state, then, we have given the schools of a generation ago a chance to show what their influence has been. All that we can conclude at present, however, is that the states which had good schools in 1900 and thereabout made good records in the Army tests in 1918, while the states that had poor schools in the former years made poor records. A causal connection between the two is strongly suggested by the increase in resemblance of the two rankings with a reduction in the number of cases. This causal connection, however, is not as yet demonstrated. Although we have no reason to doubt that a majority of the white soldiers from these states tested by Alpha in 1918 were products of the schools of the states, it is also true that they were children of the citizens who were responsible for these schools. If people tend to support schools for their children in direct proportion to their own native intelli-

[1] The correlations in both cases were computed by the "Foot-rule" formula. They are lower than the corresponding figures in Table 3, which were computed by the "Product-moment" formula. In the former case, only the rank-order is considered; each state "counts one" in the computation. In the latter case, the actual differences between the ratings of the states are taken account of for each of the measures.

gence, and if they also tend to have children with intelligence proportionate to their own, then our results so far might reasonably be used to support a strictly hereditarian hypothesis.

The force of this objection, however, is completely nullified by reference to another set of Army scores. Heretofore we have been concerned only with the white recruits; but a fair number of negroes also took the Alpha tests, and the Army report gives us the distribution of these negroes by states.[1] The scores of the negroes are lower than those of the whites as one would expect from the point of view of either heredity or environment; but the median negro scores when distributed by states *show a closer resemblance to school conditions in those States in* 1900 *than do the white scores.* Now these negroes were *not* the children of the people who determined public-school facilities a generation ago, hence the factor of heredity seems to be pretty completely ruled out here. There is left, of course, the hypothesis that the intelligent negroes distributed themselves among the states in direct proportion to the native intelligence of the white population and to the favorable environmental conditions (including good schools) which this white intelligence brought about. One can readily understand that the North has attracted many of the brighter southern negroes since the Civil War, but that they should have been drawn to states whose school systems coincided almost precisely with their degree of intelligence, and that those who remain in the South should have also picked states to live in that had schools consistent with their own intelligence—this truly seems to be carrying the hereditarian theory to the breaking point.

[1] *Memoirs of the National Academy of Sciences,* Vol. XV, p. 721, Table 248.

I shall now pass to further evidence confirming our hypothesis that the scores made on the Army Alpha tests were profoundly influenced by school opportunities and consequently that the results of the tests, when we consider the states with relatively stable populations, may be looked upon, in part at least, as tests of school efficiency a generation ago.

In the first place, two general considerations concerning the construction and validation of intelligence tests: It is well known that every so-called test of native intelligence actually and directly measures, not *native* intelligence, but *acquired* intelligence, and the inference that native abilities are revealed by the tests is valid only in comparing individuals whose educational opportunities have been equal. It is a very difficult task to find any large group of people who represent such an equivalence of educational opportunity and experience. It is possible, however, through a statistical device, to account in an approximate fashion for the operation of certain factors. Suppose I have a group of individuals who vary in their native intelligence, their age, and their schooling. I give them two distinctly different tests that measure intelligence and get for each two intelligence-ratings. I find how much schooling each had had and so obtain a "schooling" score. I learn the age of each and so have a "general experience" score. I can then by the process of "partial" correlations, "cancel out" one factor after another and approximate the probable influence that schooling and general experience have had on the two intelligence scores. If, after this canceling process is completed, there is a residue that neither schooling nor general experience has accounted for, one may assume that this residue is the contribution of *native* or *inherited* intelligence to the total that the so-called intelligence scores represent. If a high degree of residual resem-

blance remains, I may assume that, for the group tested, one or the other of the two tests actually reveals native intelligence.

This is a most interesting procedure and secures almost uncanny results. The only drawback is one that all statistical methods labor under: the reliability of the findings depends on the reliability of the original data; and in the case of the particular process referred to this is true in an unusual degree, *for the procedure itself compounds the original errors.* Thus, when the effect of schooling on intelligence scores is measured by this process of "partial correlations," one is almost certain to load the dice against schooling. The intelligence scores are immediate products of the tests and can be recorded with relative accuracy, but in estimating the effect of schooling one can usually do little except find how many years a person has been in school and then assume that three years' or four years' schooling for one person means the same as three years' or four years' schooling for every person whose record enters into the comparison.

I mention this rather technical matter, first, because I understand that the Army tests were validated as tests of native intelligence by this process, hence the fatalistic inference from the results of the tests to the effect that we are a Nation of morons *stands or falls with the fairness of this validation.* In the second place, I mention this process because the only thoroughgoing attempt that I am acquainted with actually to determine what schooling contributes to intelligence as measured by tests has employed the method of partial correlations but with an unusual degree of care that the data representing schooling should be as accurate as are the data measured as intelligence. I refer to the investigation by Cyril Burt, of London, published in 1921, in which he found that to the complete score of adolescent children measured by

the Binet tests, native intelligence contributed thirty-three per cent; general experience or the informal education of everyday life, eleven per cent; and *formal schooling, fifty-four per cent.*[1]

Nor are Burt's conclusions without striking confirmation from other sources. D. W. Willard,[2] in testing adolescent children in Seattle by two different series of the Terman group tests, found equally convincing evidence that schooling independently of native intelligence contributed approximately one half to the complete score. Again, Wendell White[3] has reported an experiment in which he measured the effect of training in silent reading on the scores made on the Otis group tests, concluding that such scores vary very widely according to the kind of instruction and training that children have had in reading.

In view of the fact that the Army Alpha tests belong to the same general type or genus as do the tests that have thus been conclusively proved to be profoundly affected by educational opportunity and stimulus, it is reasonable to infer that they too are tests of education as well as of intelligence, and that, in respect of groups so large as those represented by state contingents of troops, and groups so diverse in their educational opportunities, the proportion that schooling contributes to the median score is probably not less than one half.

With this inference as a basis, let us proceed to a further consideration of the states which have populations sufficiently stable to permit the influence of schools to be measured over at least a generation. (Table 3.)

[1] Burt Cyril,: "Mental and Scholastic Tests," London, 1921, pp. 20ff. A more detailed account of Burt's study will be found in Ch. VII.

[2] *School and Society*, Dec. 30, 1922. See also Ch. VII.

[3] *Educational Administration and Supervision*, March, 1923.

For these twenty-six states, I have used a simplified form of the Ayers index-numbers. Dr. Ayres[1] combined ten different items or components in his effort to get an index-number that would represent the efficiency of a state school system. Three of these components represented the per cent of all children of school age who attended school daily, the average number of days attended by each child of school age, and the average number of days the schools were kept open during the year. Thus both the "reach" and the "holding power" of the schools are reflected with a fair degree of accuracy. Two other items had to do with the high-school enrollment, and the remaining five were concerned with the financial support given to the schools. Ayres's ratings have been criticized because half of their weight fell on the five financial factors. In order to obviate any injustice that this might involve, I used the first three educational components which reflect the "reach" and the "holding power" of the elementary schools particularly, the first of the high-school components, and only one of the financial components (the seventh, which is based on the expenditure for schools *per capita* of the school population).[2] The revised Ayres ratings were

[1] Ayres, L. P.: "An Index-number for State School System." The Russell Sage Foundation, New York City, 1919.

[2] Ayres made his final index-number by averaging the ten components. In the accompanying tables, the index-number was not employed, but the "standard scores" of the several states on each of the five components were combined algebraically to obtain an index-number. The results differ only slightly from what they would be were the five components averaged; nor would the results be markedly different if all ten components were used according to Ayres' original index-numbers. The procedure, however, is believed by statisticians to be on the whole a more accurate method of effecting such combinations than is the method which merely averages the components.

worked out for the years 1880,[1] 1890, 1900, 1910, and 1918.

In order to have other ratings with which to compare the median Alpha scores and the school scores, the following sources were drawn upon:

(1) Professor P. Sandiford, in the *Journal of Educational Research* for November, 1923, presented a distribution of the States according to the A, B, C, and D scores that were made by their white soldiers. Reasoning from our assumption that education vitally affected the scores, we inferred that, in general, the higher scores would be made by the men who had had the longer schooling. Thus by increasing the school's opportunity to show what it has done, the resemblance between intelligence and schooling would become even closer than when the median scores were considered. This prediction was not confirmed; the correlations with schooling are very high in both cases, and for the two most significant years (1900 and 1910) are almost equal.

(2) From the census report for 1920 it was a simple matter to secure comparative ratings for our twenty-six states with reference to their literacy. To eliminate the factor presented by the high per cent of illiteracy both among the southern negroes and among the foreign-born whites, only the native-born whites are considered; and to eliminate the influence of school conditions in recent years, I have included only the native whites twenty-one years of age or older.

[1] The data for 1880 are not complete for two of the States in one or two of the components. Estimates were made in these cases. The data for high-school enrollment are also given in the Commission's Report for 1880 on a different basis from that employed in subsequent reports. Private as well as public high schools are included, and probably some of the former included elementary school pupils.

(3) Professor W. G. Reeder in *School and Society* for August 23, 1923, gives ratings for the forty-eight states based on the *per-capita* circulation in each of ten widely read magazines. These ratings correlate very highly with the scores made by state contingents of white troops on Army Alpha, and I have ventured to use them as a "check" on the Army tests.[1]

(4) Following an ancient and honored precedent in studies of this kind, I have also used the data furnished by *Who's Who in America*[2] which inform us of the states in which the notables listed in that volume were born. In each case, the number was proportioned to the population of the state averaged for the census years 1850, 1860, 1870, and 1880, with a double value given to the 1870 figures inasmuch as the years 1865–75 represent the most frequent birth-years of present-day leaders.

(5) A monograph[3] issued by the National Bureau of Economic Research in 1922 presents a careful computation of the *per-capita* income of the several states, based on the Census reports of agriculture, mining, and manufacturing for 1919. These data are by far the most trustworthy available indices of what we may call the "Economic efficiency" of the several state populations.[4]

[1] In the original article, the *per-capita* circulation of the *Literary Digest* was used in this connections.

[2] Volume for 1924-25; ratings based on the volume for 1923-24 were used in the original article.

[3] Knauth, O. W.: "The Distribution of Income by States." New York, 1922, Table VI, p. 25.

[4] In the original article a similar index number was used based on the *per-capita* value of agricultural and manufactured products.

TABLE 3.—TWENTY-SIX STATES, EACH WITH 55 PER CENT OR MORE OF ITS POPULATION NATIVE TO THE STATE (1910), RANKED ACCORDING TO SCHOOL RATINGS (1880, 1890, 1900, AND 1910), AND ACCORDING TO CERTAIN MEASURES OF PRESENT-DAY INTELLIGENCE, LEADERSHIP, AND ECONOMIC EFFICIENCY

States	Median school ratings 1880–1910	Adult white literacy '20	Pr. A & B recruits Army Apts., '18	Median white Apts. '18	Per cap. circulation, 10 mags. '22	Born-states present leaders	Per cap. income, (Knauth) '19	Median 6 present measures
Massachusetts	1	1.5	1	2	1	1	2	1
New York	2	3.5	9	7	9	5	1	4
Iowa	3	3.5	7	8	6	8	4	5
New Hampshire	4	7.5	5	11	4	2	9	6.5
Ohio	5	9	2	4	2	7	6	6.5
Vermont	6	13	3	3	3	3	7	3
Michigan	7.5	5.5	11	10	5	11	5	9.5
Illinois	7.5	10	10	9	10	10	3	11
Maine	9	12	6	5	7	6	11	8
Wisconsin	10	5.5	12	13	13	9	12	12
Indiana	11.5	11	15	16	8	14	10	13
Pennsylvania	11.5	7.5	8	6	11	13	8	9.5
Utah	13	1.5	4	1	12	4	16	2
Maryland	14	14	16	15	15	12	7	14
Missouri	15	15	13	12	14	16	15	15
Kentucky	16	23	23	25	19	17	21	23
Tennessee	17.5	24	17	19	20	20	24	18
Texas	17.5	16	18	17	16	21	13	17
Virginia	19	20	14	14	17	15	19	16
Georgia	20	19	20	23	24	23	20	21.5
Mississippi	21	17	25	26	23	25	25	26
Louisiana	22	26	21	21	18	24	18	20
Alabama	23.5	21	19	20	26	22	26	21.5
South Carolina	23.5	22	22	18	25	19	17	19
Arkansas	25	18	26	24	22	26	23	25
North Carolina	26	25	24	22	21	18	22	24
Correlations with school-ratings:								
For 1880	.....	0.70	0.83	0.83	0.90	**0.92**	0.78	
For 1890	.....	0.80	0.83	0.82	0.92	0.86	**0.88**	
For 1900	.....	**0.89**	**0.88**	**0.89**	0.96	0.87	0.86	
For 1910	.....	**0.89**	0.87	0.87	**0.97**	0.87	0.84	
For 1920	.....	0.82[1]	0.82[1]	0.83[1]	0.93	0.79	0.63	

[1] School-ratings for 1918.

TABLE 4.—INTER-CORRELATIONS

	A & B Alpha	Magazines	Leaders	Income	Schools
A & B Alpha....		0.91	0.87	0.73	0.88
Magazines.....	0.91		0.85	0.84	0.97
Leaders.....	0.87	0.85		0.71	0.91
Income.....	0.73	0.84	0.71		0.88
Schools.....	0.88	0.97	0.92	0.88	
Averages.....	0.85	0.89	0.84	0.79	0.91

TABLE 5.—PARTIAL CORRELATIONS

A & B Alpha and magazines, schools constant, residual r.	+0.49
Schools and magazines, A & B Alpha constant, residual r.	+0.86
Schools and A & B Alpha, magazines constant, residual r.	−0.03
A & B Alpha and leaders, schools constant, residual r....	+0.35
Schools and A & B Alpha, leaders constant, residual r....	+0.43
Schools and Leaders, A & B Alpha constant, residual r...	+0.61
A & B Alpha and income, schools constant, residual r....	−0.19
Schools and A and B Alpha, income constant, residual r..	+0.73
Schools and income, A & B Alpha constant, residual r....	+0.73
Magazines and leaders, schools constant, residual r.....	−0.32
Schools and magazines, leaders constant, residual r.....	+0.89
Schools and leaders, magazines constant, residual r.....	+0.67
Magazines and income, schools constant, residual r.....	−0.12
Schools and magazines, income constant, residual r.....	+0.89
Schools and income, magazines constant, residual r.....	+0.49
Leaders and income, schools constant, residual r.....	−0.46
Schools and leaders, income constant, residual r.....	+0.85
Schools and income, leaders constant, residual r.....	+0.80
Average correlation of school opportunity of the past with four present-day measures of intelligence, leadership, and economic efficiency when the influence of each of these is, in turn, canceled.....	+0.66
Average correlation of each of these measures with one another when the influence of school opportunity is canceled.....	−0.09

The high correlations among all of these measures of intelligence and efficiency are obvious from an inspection of the ratings. By taking the median rank of each State we can readily work out a combined intelligence and efficiency rating, which is shown in the last column of Table 3. The first column is a similarly combined rating of school efficiency for the years 1880, 1890, 1900, and 1910. Underneath each column are the correlation-coefficients which show the resemblance of each ranking to the school ranking for each of these four decades and for 1920. Of particular significance are not only the uniformly high correlations that we find, but also the fact that, *without exception, the highest correlations fall where they should if our theory of the influence of schooling is correct.* The Army tests show the closest resemblance to school conditions in 1900 and 1910, as they should. The distribution of present-day leaders coincides almost perfectly with the distribution of school facilities in 1880. The *per-capita* circulation of magazines shows very high correlations with school conditions for all of the decades, and especially for 1900 and 1910. Present-day *per-capita* income is closely associated with school efficiency during the decades when the present dominant generation was in school, the resemblances being closest for the years 1890 and 1900. Recent school conditions have not affected the present dominant generations, but school conditions twenty, thirty, and forty years ago did have a profound effect if our figures tell the truth.

Still further evidence of the effect of schooling is revealed by the comparisons set forth in Table 4. Except for one case, the resemblances of the school-ratings to each of the other ratings are higher than are the resemblances of the other ratings to one another, while the average of the correlations with schooling easily

overtops the averages of the other correlations. The "partial" correlations of Table 5 are also seen to confirm in a fairly emphatic fashion the hypothesis that ascribes a predominating *causal influence to school opportunity in determining the relative intelligence, efficiency, and leadership of different population-groups*—and this in spite of the fact that the data from which the school-ratings were constructed furnish only a fractional record of what the schools have actually accomplished.

II

Let us now consider some of these states in detail. Most of them, it will be noted, show a fairly consistent position in every rating, or almost every rating. If our theory is correct, *most of them fall almost unerringly into the niches that their schools of a generation ago prepared for them.* Some of them do not. These I shall refer to presently. Let us first consider one or two of those that do.

I turn to the first state on the list Massachusetts. I call attention to the uniformly high ratings that it has to its credit. It is not first in everything, but among the twenty-six states it never falls below the second rank. "The old New England stock," I hear the hereditarian say. I admit that there is something of "old New England" in the position that Massachusetts holds on this list; but it is not the "old New England stock" in my opinion; it is rather the old New England schools and the New England ideal of education. Massachusetts just "squeezed" into our list; in 1910, just fifty-five per cent of its population was native to the State. Nor is this all; even of that fifty-five per cent a substantial proportion were *not* of old New England stock. They were second-generation and third-generation descendants of immigrants from countries whose native sons when tested

by Army Alpha made tolerably low median scores. As long ago as 1900, less than forty per cent of the people of Massachusetts represented old New England stock—not more than thirty-eight per cent, indeed, if the census figures for 1900 are to be trusted. The proportion in 1920 was certainly less than one third. *And yet, with the handicap of what the hereditarian would classify as an unpromising immigrant population of really overwhelming proportions, Massachusetts, among these twenty-six States, has held an unquestioned leadership.*[1] No one can examine the school statistics of Massachusetts for the three decades between 1880 and 1910 and then in the light of her present status doubt that her schools have fundamentally influenced a population quite different from her original stock.

New Hampshire tells the same story, although less emphatically. This, too, is one of the states that comes just within our list; it has a large proportion of foreign-born among its inhabitants. Connecticut is not included in our list.[2] If it were, it would be seen to rival Massachusetts in the measure in which it has overcome the handicap of an unfavorable immigrant population. Vermont and Maine have not had so heavy a handicap and so far have more than held their own *in spite of a continuous emigration westward of what the hereditarian would regard as the stronger native stock.*

I now pass to the State that shows the most marked inconsistency between its apparent school conditions thirty and forty years ago and its present high station.

[1] In the Appendix the forty-eight states are ranked according to their combined scores on ten measures of intelligence, leadership, economic efficiency, and morality. It is noteworthy that Massachusetts leads all of the other states on this combined ranking.

[2] Note, however, Connecticut's high place on the several rankings included in the Appendix.

Utah, it will be noted, stands consistently high in all of the intelligence ratings, and in the combined rating is second only to Massachusetts; yet thirty years ago its educational status according to our ratings was not high. This fact, however, need not disconcert us. Before 1890 Utah was educating its children, and educating them well, but it was not educating them in public schools to any great extent. The Mormon Church from the time of the great "trek" laid a heavy emphasis upon education. Schools for children were in operation indeed on the long overland journey. Church and home and school were unified in the early pioneer life. In 1880, Utah among our twenty-six States stood second in the proportion of its children in *private* secondary schools. The census reports for 1880 and 1890, which consider both public and private school attendance, fully substantiate my statement that the children of Utah were not being neglected. Our figures, however, are figures for *public-school* attendance taken from the reports of the Bureau of Education, and for this reason the position of Utah on this list is not so high as it would be if our measures were more nearly accurate.

But there is something else about Utah's distinguished position on the intelligence ratings that merits attention. The leaders of the Mormon Church who laid the firm foundation of education in Utah came chiefly from New England. They brought with them the New England ideal of schools and schooling. I have been credibly informed that the rank and file of the Mormon population did *not* represent a group that was highly selected in the sense in which the hereditarian uses this term. Large segments of the population came from southern states that do not show up well on our list. Other segments were proselyted by missionaries who worked

through the highways and by-ways of the eastern states and western Europe. And yet just as Massachusetts and Connecticut have clearly succeeded in counteracting through their schools the heavy dilution of their sturdy native stock, so Utah has apparently succeeded in taking a heterogeneous and generally unselected population and transforming it into one of the most intelligent and progressive of American commonwealths.

It is interesting to speculate as to the future. Will New England, with this heavy dilution of her old Puritan stock, continue to retain her leadership? Is it not a plausible hypothesis that the answer depends very largely on the extent to which her ideals of public education are retained and strengthened? In other words, *it is a dilution of ideals that is the significant danger*. There are apparently forces at work now in Massachusetts leading toward relatively lower standards. Massachusetts has had so long an educational "lead" that these forces have not yet had a chance to work much mischief. And yet Massachusetts, as compared with the far-western states, has not made much educational progress during the past twenty years, as her statistics show.[1] Indeed, in some important items she has fallen slightly backward. So far, the momentum of her initial "lead" has kept her well to the front; her tradition has been sufficient to counteract the dilution of her native stock. But if the dilution reaches the point where it destroys the tradition, another generation will tell a different story. In the meantime, the lesson of Massachusetts seems clear and incontestable: good public schools, even with the handicap of a large immigrant population, can and do insure a relatively high level of trained and informed intelligence. There is no

[1] Note in the Appendix the school ratings for the 48 states for 1910 and 1920.

reason to believe that the level can not be sustained *if the ideals are kept alive.*

It is most unfortunate that the results of the Army tests should have been used so exclusively to justify pessimism, despair, and reaction—unfortunate because unnecessary. Rightly interpreted, the results of the tests speak with compelling force, not for educational restriction, but for educational expansion. They tell us convincingly that the level of *trained and informed* intelligence in the Nation as a whole could be substantially raised within a generation. They tell us that where schools have been neglected, there is relative weakness; where schools have been cherished there is relative strength. They tell us that teachers of the past have not done their work in vain, however little we of the present may regard their methods and materials. These teachers could not turn morons into genuises, nor can we; but they did something and we can do something to lift every mind a little higher—and every gain, no matter how slight, is a gain for the Nation.

CHAPTER V

ON THE POSSIBILITY OF SECURING "MORAL RATINGS" FOR THE SEVERAL STATES[1]

I

The Importance of Mass Measures for Education

It is generally agreed that the education of the individual is best measured by the improvement that it effects in individual conduct. A person who has had the advantages of schooling is expected, not only to *know more* than the unschooled person, but *more efficiently to do*, and to *choose better* those acts that he wills to do.

It has long been the contention of the present writer that mass-education should be subjected to the same type of test[2]—that the value of a public-school system should be clearly evidenced in mass-conduct. This standard, however, has been applied to mass-education only to a very limited extent. It is the custom to measure the efficiency of school systems by the per cent of those of school age who are enrolled in the schools, the per cent of those enrolled who are in daily attendance, the length of the school year, the expenditures *per capita*

[1] This paper was published in *School Administration and Supervision*, May, 1925.

[2] This was proposed in a paper read before the Department of Superintendence, National Education Association, at the Philadelphia meeting in 1913. At this meeting, as well as previously (in editorials in *School and Home Education*) and later (in *School Discipline*, 1914, and in editorials in the *Journal of the National Education Association*) the writer has called attention to the serious situation revealed by the mounting crime-curves.

of enrollment and of population, and similar intrinsic factors. Apparently the only commonly-employed measure of the *results* of mass-education is that which is represented by the statistics of illiteracy in the adult population.

There are, however, numerous other social measures that should reflect the influence of mass-education. Some of these the writer has referred to in earlier papers.[1] For example, there is a fairly close resemblance between the rank-order of the states as determined by the median score made by their recruits on the Alpha Tests and the rank-order of the same states as determined by the Ayres Index Numbers for 1900. By taking only the states in which the population is relatively stable (thus eliminating in part the factor of interstate migration), this resemblance becomes even more clearly marked than when all of the states are considered, and it is significantly closer for the years when the recruits were in school than for any other years.

In a similar way, a high positive correlation has been established between the school facilities afforded by the states and their proportionate production of present-day leaders. Here the resemblance is much closer to school ratings for 1880 (a year when the present-day leaders were in school) than to school ratings for 1890, 1900, 1910, or 1918. Close resemblances also exist between school facilities a generation ago and present-day *per-capita* income; between school facilities a generation ago and the proportionate circulation among the states today of 10 leading magazines; and between school facilities and *per-capita* savings-bank deposits. That these resemblances (all of which are very close) indicate that schooling has been in part responsible for the degree of mass-achievement reflected by the measures is a reason-

[1] See Chs. IV and V.

able assumption. That selection on the basis of inherited capacities contributes to the results is doubtless true, but the evidence suggests clearly that the influence of this factor is not considerable. Indeed, the factor of climate seems to be more significant than the factor of heredity;[1] but even this seems to be subordinate to the factor of education.

The clear suggestion of these earlier studies is that mass-education would do well to seek in social statistics (as revealing mass-achievements and mass-deficiencies) both the confirmation of its successful efforts and the points at which its efforts are apparently either unavailing or (it may be) even abortive. Programs of health education, for example, have been developed on a large scale within the past 20 years. There has been a parallel, and in recent years a pronounced, decline in the death-rate from most diseases. A causal relationship here may be hard to establish; other forces in addition to schooling certainly have been at work; but it is also true that the effectiveness of these other forces has been dependent, probably in a large degree, upon the work that the schools have accomplished, whether directly through health teaching or indirectly through increasing literacy and raising the general level of trained and informed intelligence. In any case, the curve goes in the right direction, and education may well be encouraged in its efforts.

Other objectives that education has sought to attain may be subjected to mass-measures. It should not be an impossible task to find whether the instruction and training in music that has been a feature of our schools for a generation has actually raised the level of musical taste and appreciation among the people as a whole. A

[1] This is clearly true in so far as any marked influence of *racial* inheritance is concerned.

study of "popular songs," taking account of any change in their character and of their vogue and circulation, and perhaps employing quantitative measures, is indicated here; as is also the increased or decreased *per-capita* demand for music indisputably recognized as "good" music. Has the public taste for good literature been perceptibly affected by the teaching of literature on a universal scale in our elementary and high schools? Mass-measures for this factor can probably be devised—for example, by getting from publishers facts relative to the distribution of book-sales, much as Professor Reeder[1] got from the publishers the facts of magazine circulation.

The difficulties that stand in the way of such investigations are obvious enough; but they are not altogether insurmountable. Among them are the migrant tendencies of our people; but these do not affect measures that are applied to the nation as a whole; and there are at least 30 states with populations sufficiently stable to justify state studies. The foreign-born contingents are a handicap, but the proportion of foreign-born is rapidly decreasing under the present immigration policies. The relative significance of coöperating factors, too, can be determined, in some cases at least, by the technique of partial correlations.

II

The Crime Curves and Their Significance

There is one group of mass-measures that should be of especial significance to public education. These are the measures that are reflected in the statistics of crime.

[1] Reeder, W. G.: *School and Society*, Vol. XVIII, No. 452, pp. 235ff.; also *Educational Research Bulletin*, Ohio State University, Vol. III, No. 9, Apr. 30, 1924, pp. 179ff.

The earlier studies referred to above did not utilize these measures, because at that time it seemed impossible to find any way of making just comparisons of the several states on the basis of what we may call "moral" counts. However, the measures of economic efficiency, production of leaders, and trained intelligence certainly need to be supplemented or complemented by "moral" measures. In themselves, they are not enough; something convincing is necessary regarding the most basic of all of the qualities that education should influence.

This need is clearly revealed by some facts which we may not like to contemplate but which none the less resolutely must be faced. Our country has grown enormously in *per-capita* wealth and *per-capita* income within the past two decades—and public education, as we have seen, has been, beyond doubt, an important factor in promoting this growth. The people not only earn more money, but they save more money; and here again the public school has apparently played a positive rôle. The death-rate from most natural causes has steadily declined; the people are healthier and tend to live longer. They are reading more, whether or not the character of what they read has shown any improvement. A substantial measure of credit may be claimed by public education for all of these changes.

Generally speaking, then, the symptoms and signs of progress are unmistakable, but there is one basic respect in which conditions have been getting progressively worse instead of better. While minor crimes and misdemeanors seem to be decreasing, the increase in serious crime during the past decade has been so marked as to cause the gravest concern.

Undoubtedly the most reliable single index of the general situation regarding serious crime is furnished by the homicide-rates, for murder is hard to conceal and the

great majority of murders become matters of record. Our national homicide rate has been a national scandal for decades. The discouraging fact is that it is a scandal which so far shows no signs of abatement. The latest published official report is for 1921,[1] and shows a steady increase in the murder rate during the 10 preceding years. Unofficial but reliable sources[2] indicate still more alarming increases during the past three years.

A few significant details will serve to emphasize the very serious character of the present situation:

1. Our national murder-rate is far higher than that of any other civilized country—40 times as high as that of Switzerland, 16 times the rate of either Ontario or Quebec, 11 times that of England, twice that of Italy, and so on.[3]

2. It does not seem that the high homicide rate can be charged to any great extent against immigration. Indeed, in a very striking fashion, and almost without exception, the states that have the highest proportions of foreign-born population have relatively low homicide rates; (that is, low for the United States; even the best American state in this regard does not stand well in comparison with other countries).

3. While the homicide rate is higher among the negroes than among the whites, it is not reduced very much even if the negroes of the Southern states are

[1] *Mortality Statistics*, 1921. Bur. of the Census, 1924, p. 86.

[2] Hoffman, F. L. (insurance statistician and probably the leading statistical authority on death-rates): *The Spectator* (New York) Vol. CVII, No. 19, May 8, 1924, pp. 3ff.: "The trend of the American murder-record continues in an upward direction . . . the most amazing murder-record for any civilized country for which data are available."

[3] Hoffman, F. L., in reference cited; the rates for several foreign countries are appended to Table 6 of the present article.

excluded from the computations. Furthermore, the rate during the past decade increased among the whites and decreased somewhat among the negroes.[1]

4. While the cities in general have a somewhat higher rate than the country as a whole, the proportionate increase during the past 10 years has been greater in the rural areas than in the urban areas.

It seems, then, that the native-born white population cannot shift the responsibility either to the immigrant or to the negro; nor can rural America claim a much larger share of virtue than urban America. Furthermore, it is improbable that the increase in serious crime can be attributed in any marked degree to the war. England, on the same counts, has shown a steady decrease in crime during the period when crime in this country has been increasing. It is interesting to note[2] that English educators are claiming this decrease as a result of education.

As to the causes of our mounting crime-curves, opinions differ radically. The mobility of our population, which tends undoubtedly to loosen social restraints, is probably an important factor. The apparent decline in the force both of religious sanctions and of their inhibitory influences possibly contributes something to the general situation. The rapidly increasing wealth has brought extravagance, ostentation, and luxury in its train; ostentation breeds envy, envy breeds hate, and hate breeds crime. Prohibition, which has had a clearly demonstrable influence in diminishing minor crimes, apparently has not diminished major crimes,

[1] See data for the past decade in *Mortality Statistics*, 1921, p. 86. Dr. Raymond Pearl in *Science*, Vol. LX, No. 1557, Oct. 31, 1924, p. 394 points out that pauperism between 1910 and 1923 decreased more, proportionately, among the negroes than among the whites.

[2] *The Schoolmaster*, London, Nov. 14, 1924, p. 740.

and may have played a part in the recent sharp increases —although the murder-rate was mounting long before 1920. The lax enforcement of the laws has been blamed: but, as an explanation, seems to beg the question; for it is incontestable that law-enforcement will depend upon the moral support given by the public to the enforcing agencies.[1]

A basic and fundamental factor must doubtless be sought back of all contributing or secondary causes. Whether this factor can be found, and whether education can do anything to correct conditions if it is found, are questions that should not delay the search. Clearly education can lay little claim to social responsibility if it persits in ignoring such a situation as the crime-curves reveal. We are talking much of promoting peace through the efforts of the schools, and of thus ending for all time the wastage of life that legalized slaughter involves; but if the present murder-rate is not diminished for another four years more Americans within that time will meet death at the hands of assassins than fell before the enemy's shells and bullets during 18 months of the bloodiest war in history. The peril to life involved in the increasing automobile traffic has given rise to a distinct movement in our schools for "safety education;" but in 1921 the risk of death from murder was almost 75 per cent as great as the risk of death from an automobile accident.

[1] "The first [cause of the increase in crime in this country] is the apathetic attitude of the people toward the strict enforcement of the law and the punishment of the criminal, and the second is the unwillingness of the people themselves to respect the law of the land and to train the children of the country to obedience for the lawful constitute authority." Judge Talley, of New York City, in the *Police Journal*, Vol. XII, No. 1, Jan. 1925, p. 23.

III

Three Ratings of the States on Moral Counts

The situation described above led the present writer to seek for means of rating the several states on the basis of measures that would reflect the general level of basic morality and respect for fundamental law. The first aim was to determine whether good public schools had the same positive relationship to these qualities that they have to economic efficiency, the production of leaders, and the general level of intelligence. A second aim, which came gradually to the front, was to determine whether the distribution of the states on the "moral" counts would in any way suggest the factors that might explain the rising crime-curves.

The first recourse, quite naturally, was to the prison statistics of the states. Beyond the fact that the prison-population has been increasing, however, these yield few data that can be used for comparative purposes—probably because both state laws and their enforcement vary widely throughout the country.

The next suggestion pointed to the records of the three Federal prisons to which are committed most of those convicted under Federal laws. Because (in theory at least) Federal laws operate uniformly throughout the country, these records should be of very great value in comparing the states. Inquiry at the Department of Justice failed to bring any light on the problem, and the published reports of the Federal prisons were equally unavailing except in one of the three cases—and this[1] in the absence of the other two could not help us. Finally Dr. J. K. Norton, research director of the National Education Association, found for me data

[1] The Federal penitentiary at Leavenworth, Kansas, the annual reports of which give the birth-states of the native-born prisoners.

collected by the Bureau of the Census regarding 1580 native-born and 423 foreign-born Federal prisoners committed during the first six months of 1923. These records (as yet unpublished) include important facts regarding the birth-states of the native-born prisoners, the nationalities of the foreign-born, and the educational status of all prisoners committed to the three Federal prisons during the period covered by the inquiry. Through the courtesy of the Census Office, Mr. Norton was permitted to have these data tabulated from the original cards; and it is now possible to present ratings of the 48 states based on the proportionate number of persons born in the several states who were committed to the Federal penitentiaries during the first six months of 1923. These ratings in their rank-order are set forth in Table 6. The number in each case is proportioned to the population of the state in 1890,[1] as the median age at the time of commitment was 32 years in two of the prisons and 31 years in the third.

For the states with small populations, of course, ratings of this sort have a high degree of unreliability, and it is likely that more than one of these small states are misplaced in the rank-order. It should also be borne in mind that not all prisoners convicted in the Federal courts are committed to one or another of the three penitentiaries. Some Federal prisoners are confined in state penitentiaries; others (especially those whose sentences are short) are sent to county or municipal jails or reformatories. The latest available report of the Department of Justice (that for 1922) refers to the

[1] Except for the states starred and double-starred in Table 6. In the former the population-data for 1900 were used, and in the latter the mean of the figures for 1890 and 1900. An examination of the age-data of the prisoners born in these states revealed somewhat later birth-dates than for the other states.

prisoners in the three Federal penitentiaries and in the state prisons as constituting the "penal class," thus contrasting them with the Federal prisoners committed for short sentences to jails and reformatories.[1] The number of prisoners of the "penal class" outside of the three Federal prisons is not large;[2] hence it may be assumed that the ratings set forth in Table 6 are in the main fairly accurate. From the data set forth in the report[3] of the Department of Justice for the preceding year (1922), however, it would seem possible that Massachusetts, Rhode Island, and Wisconsin may have a somewhat higher rank in Table 6 than they actually deserve.[4]

[1] *Annual Report of the Attorney General of the United States*, 1922, Gov't Printing Office, 1922, p. 73.

[2] For the year ending June 30, 1922, 5540 prisoners were confined in the three Federal penitentiaries as against only 244 Federal prisoners in state and territorial prisons.

[3] Exhibit No. 10, p. 322.

[4] As a possible check on the ratings given in Table 6, I found the number of prisoners committed to the *State* prisons of New York and California during the two years ending June 30, 1922, who were born in *other states*. I then proportioned the number born in each state to the total number of persons living in New York and California in 1920 who were natives of the state in question. In view of the fact that both New York and California have had large accessions of population from other states, this method seemed to promise a fair comparison with the data from the Federal penitentiaries. The correlation between the two ratings (birth-states of Federal prisoners and birth-states of State prisoners) is 0.62. When the New York list alone is compared with the Federal rankings, the correlation is 0.65; and when states having fewer than 1000 of their native-born now living in New York are excluded, the correlation is 0.70. When the California list is considered without New York, the correlation is much lower, 0.34. It is noteworthy that some of the New England states (especially Massachusetts and Connecticut) stand lower on the California list than on either the New York or the Federal list. A table of ratings based on the New York and California prison-data will be found in the Appendix. (Table 15.)

TABLE 6.—NATIVE-BORN PRISONERS COMMITTED TO THE THREE FEDERAL PENITENTIARIES JAN. 1–JULY 1, 1923, DISTRIBUTED ACCORDING TO THE STATES OF BIRTH PROPORTIONATELY TO THE POPULATION OF THE SEVERAL STATES, CENSUS OF 1890 (EXCEPT FOR STATES STARRED, WHERE THE CENSUS OF 1900 WAS THE BASE, AND THE STATES DOUBLE-STARRED, WHERE THE BASE WAS THE MEAN BETWEEN 1890 AND 1900 CENSUS FIGURES)

Rank	Birth-state	Number committed 1st 6 months 1923	Prop. to 1,000,000 of pop.	Rank	Birth-state	Number committed 1st 6 months 1923	Prop. to 1,000,000 pop.
1	Vermont	0	0	25	Washington	10	23.0*
2	New Hampshire	1	2.6	26	S. Carolina	27	23.45
3	Maine	3	4.5	27	Kansas	34	23.48**
4	Rhode Island	2	4.6*	28	Arizona	3	24.3*
5	Delaware	1	5.9	29	Oregon	8	25.1
6	Idaho	1	6.1*	30	Ohio	96	26.1
7	New Jersey	13	7.8**	31	Mississippi	36	27.9
8	Wisconsin	15	7.9**	32	Kentucky	53	28.5
9	Massachusetts	22	9.8	33	Utah	6	28.8
10	North Dakota	2	10.9	34	Louisiana	39	31.2**
11	Pennsylvania	58	11.0	35	N. Carolina	51	3.15
12	Nebraska	12	11.2	36	Alabama	48	31.7
13	Connecticut	9	12.0	37	Virginia	54	32.6
14	Minnesota	16	12.1	38	W. Virginia	25	32.7
15	Michigan	30	14.3	39	Oklahoma	26	32.9*
16	South Dakota	5	15.1	40	Missouri	96	33.1**
17	Iowa	35	16.8	41	Florida	16	34.8**
18	New York	106	17.8	42	Arkansas	44	36.0
19	Colorado	11	20.3*	43	California	50	37.0**
20	Montana	5	20.5*	44	Texas	114	42.9**
21	Maryland	22	21.1	45	Georgia	94	51.1
22	Wyoming	2	21.5	46	Tennessee	94	53.1
23	Illinois	87	22.7	47	New Mexico	10	57.1**
24	Indiana	53	22.9**	48	Nevada	3	65.2

TABLE 7.—HOMICIDES TO THE MILLION OF POPULATION

Thirty-four registration states. Average rates for 1919, 1920, 1921. (*Mortality Statistics*, 1921. Bureau of the Census, 1924, p. 87)

1. New Hampshire	17	18. Washington	61
2. Maine	17.3	19. Kansas	62.3
3. Wisconsin	19	20. Delaware	62.6
4. Vermont	20	21. Ohio	73
5. Massachusetts	25	22. Illinois	75
6. Rhode Island	27.3	23. Montana	77
7. Minnesota	27.6	24. North Carolina	79
8. Connecticut	39	25. Missouri	92
9. Nebraska	45	26. California	97
10. New Jersey	46	27. Colorado	105
11. New York	47	28. Kentucky	110
12. Michigan	48	29. Virginia	114
13. Utah	49	30. Tennessee	152
14. Indiana	52	31. South Carolina	153
15. Oregon	53	32. Louisiana	166
16. Pennsylvania	59	33. Mississippi	169
17. Maryland	60	34. Florida	209

U. S. registration states, average 1919, 1920, 1921 ..... 77.0
U. S. registration cities, average 1919, 1920, 1921 ..... 94.0

Homicide rates of certain foreign countries; (basis, as in the above list, 1 : 1,000,000 pop.); rates stated on authority of Dr. F. L. Hoffman: *The Spectator*, May 8, 1924

Switzerland	1.8
Holland	3.1
Scotland	4.0
Ontario	5.3
Quebec	5.4
England	7.6
Norway	8.2
Ireland	9.2
Spain	9.2
New Zealand	9.3
Sweden	13.2
South Africa	17.9
Australia	18.8
Italy	35.9

TABLE 8.—FORTY-EIGHT STATES RANKED ACCORDING TO THE PER CENT OF EACH STATE'S QUOTA OF DRAFTED SOLDIERS (SECOND MILLION OF DRAFT) FOUND INFECTED WITH VENEREAL DISEASES AT THE TIME OF ARRIVAL AT MOBILIZATION CAMPS[1]

Rank	State	Per cent draftees infected	Rank	State	Per cent draftees infected
1	Vermont	1.3	25	Pennsylvania	3.6
2	South Dakota	1.6	26	Kentucky	4.0
3	New Hampshire	1.8	27	Ohio	4.1
4.5	North Dakota	1.9	28	Michigan	4.5
4.5	Utah	1.9	29	Indiana	4.7
6	Wisconsin	2.0	30	Arizona	4.8
7.5	Oregon	2.2	31.5	West Virginia	5.3
7.5	Idaho	2.2	31.5	Illinois	5.3
9	Wyoming	2.3	33.5	Tennessee	6.5
11	Massachusetts	2.4	33.5	Missouri	6.5
11	Maine	2.4	35.5	Maryland	6.7
11	Minnesota	2.4	35.5	New Mexico	6.7
13	Colorado	2.5	37	North Carolina	7.0
14	Connecticut	2.7	38	Virginia	7.1
15.5	Rhode Island	2.8	39	Delaware	7.7
15.5	California	2.8	40	Oklahoma	8.5
17	Washington	2.9	41	Arkansas	10.5
19	New York	3.0	42	Texas	11.2
19	Iowa	3.0	43	Alabama	11.5
19	Kansas	3.0	44	Louisiana	12.1
21	Nebraska	3.1	45	South Carolina	13.1
22	Nevada	3.3	46	Mississippi	13.2
23	Montana	3.4	47	Florida	13.3
24	New Jersey	3.5	48	Georgia	13.6

[1] Data from *Social Hygiene*, Vol. VII, No. 4, p. 420, based on Love, A. G. and Davenport, C. B.: "Defects Found in Drafted Men" Gov't Pr't'g Office, 1920, Table II.

In any event, the general consistency of this ranking with the two rankings to be presented later clearly suggests that the relative number of commitments for violation of Federal laws may well be taken as an index of a state's "fecundity" in producing criminals. Accurate records extending over several years, and

including all convictions for violations of Federal laws, would doubtless permit some very significant conclusions to be drawn. Even with the limited number of cases available now, and the brief period of commitments that they cover, there is a suggestive correlation of 0.73 between the rank-order of the birth-states of criminals and the *inverse*[1] rank-order of the states as birth-states of the leaders listed in the current volume of "Who's Who in America."[2] In other words, if our data are at all reliable, they suggest that the several states tend to produce criminals inversely as they produce leaders.

The ratings presented in Table 7 are based on the homicide-rates of the states constituting the "registration area." The number of states in which deaths are recorded in a uniform way and reported to the Bureau of the Census has gradually increased until it is now large enough to permit provisional comparisons between this ranking and other rankings. While there are still 14 states missing, every section of the country is now well represented. The "cases" represented by the homicide ratings, of course, comprise the victims rather than the criminals, and it is obvious that not every murder in a state is committed by a person born in the state or even by a resident. On the other hand, the frequency or infrequency of murder certainly tends to reflect the general respect for fundamental law that prevails in a given community; and the fact that the rates for any one state show little variation year after

[1] To avoid confusion, all of the rankings presented in this article are in the descending order of virtue,—the best state leading each list and the worst state closing it.

[2] The birth-states are summarized in each volume of *Who's Who in America*. In the present study the edition for 1924-25 was used. The number credited to each state was proportioned to the population of the state, Census of 1870.

year (except, unfortunately, in most cases the tendency to increase) justifies one in taking the average murder-rate over a series of years as a reliable index of respect for law. In the accompanying table, the average for 1919, 1920, and 1921 is the basis of the comparisons.

For the states with large negro populations, the census figures give both the total rate and also the rates for the negroes and the whites respectively. Table 7 is based on the total rate. The relative positions of the several states would not be essentially changed if the white rates alone were used.[1]

Table III presents, not criminal ratings, but rather ratings of sex mortality.[2] It is based on the per cent of the drafted soldiers from each state in the second million of the draft who were found to be infected with venereal diseases on their arrival at the training camps. Unfortunately no record was made of race or nationality; and the very high per cents among the soldiers from some of the southern states are undoubtedly due to the negro contingents. Otherwise, these ratings are among the most trustworthy now available.

IV

The Relation of the Moral Ratings to Climate, Immigration, Race, and Intelligence

An inspection of the three rankings is enough to show that there is a fairly high degree of consistency among them. Reduced to correlation coefficients (based on rank-order only) the degrees of resemblance are as follows·

[1] Nor are the ratings in Table 6 essentially changed when the southern negroes are eliminated and the proportion of *white* prisoners to total *white* population is made the basis of the comparison.

[2] Data from *Social Hygiene*, Vol. IV, p. 420.

Between homicide-rates and birth-states of Federal prisoners (34 states)..... $r = 0.82 \pm .036$
Between homicide-rates and per cent venereal disease infection (34 states)..... $r = 0.79 \pm .036$
Between birth-states of Federal prisoners and per cent venereal disease infection (48 states) $r = 0.68 \pm .06$

While these resemblances are not so close in general as are those that are found when the states are compared on the basis of economic and intelligence measures, they are by no means unimpressive, and they suggest plainly enough that certain underlying conditions may operate to determine respect for fundamental law and morality. If these conditions can be disclosed, they may furnish a cue to the necessary corrective measures.

The most obvious parallelism does not offer much hope; it seems to be that between mass morality and *latitude*. With the exception of Michigan, Montana, and Washington, and northernmost states tend to rank consistently among the highest, and the southernmost states with the exception of Arizona and California (the latter on one count) tend to fall consistently among the lowest. On the other hand, the bulk of the population of Ontario lives in the latitude of Michigan; yet Michigan has a murder-rate eight times that of Ontario. Maine and the inhabited portions of Quebec are not far apart in latitude, yet Quebec gets along with nearly one third of Maine's murder-rate. The interstate comparisons also show inconsistencies. Ohio falls well below New Jersey on every count, and New York below Connecticut. Considering the whites alone, North Carolina has a lower murder rate than Ohio or Illinois, and for whites and negroes combined its murder-rate is lower than those of Colorado and California. The geographical factor is impressive, and climate doubtless exerts a controlling influence of considerable magnitude. It is fairly clear,

however, that this influence can be modified in some measure by other forces.

It was said in an earlier section of this paper that the high homicide-rate cannot be charged to any great extent against the immigrant, for the states with the largest proportions of immigrant population have, in general, relatively low murder-rates.[1] It is also true that homicides and other serious crimes have increased markedly during a decade that has shown only a very slight increase in the foreign-born population and a decrease in its proportion to the native-born population.

On the other hand, it is incontestable that certain elements in the foreign-born population contribute far more than their proportionate share to the output of criminals and crime. The records of commitments to the three Federal penitentiaries included 423 foreign-born prisoners as against 1580 native-born prisoners. Thus the foreign-born population, which was only 13 per cent of the total population in 1920, contributed 21 per cent to the Federal prisoners who were committed during the first six months of 1923. In proportion to their percentile representation in the total population, the following nationalities contributed more Federal prisoners than did the native-born population: Mexicans, Chinese, Italians, Austrians, and Russians; but the Swedish, Irish, German, English, Polish and Canadian contingents contributed fewer prisoners proportionately than did the native-born population.[2]

[1] There is, indeed, a correlation of 0.72 between the *in*frequency of homicides and the per cent of foreign-born in the states' populations, and a correlation of 0.67 between the *in*frequency of venereal diseases and the per cent of foreign-born in the states' populations.

[2] In both instances, mention is made only of the nationalities that are heavily represented either in the foreign-born population or in the total number of foreign-born prisoners committed.

The relatively high proportion of criminality among the negroes is also reflected in the data from the Federal penitentiaries. Constituting only 9.9 per cent of the native-born population (1920), the negroes formed 21.5 per cent of the Federal prisoners committed during the first six months of 1923.

The resemblance of the moral rankings of the states to such intelligence rankings as are furnished by the Alpha Tests and Reeder's study of the *per-capita* circulation of 10 magazines is positive but, with one exception,[1] not close.

V

The Relation of the Moral Ratings to School Ratings

The resemblances of the moral ratings to the Ayres school ratings for 1900 are positive, but less marked than the resemblances between the economic, intelligence, and leadership ratings and the school ratings of a generation ago:

34 states, infrequency of homicides and school ratings, 1900 ..... $r = 0.55$
48 states, infrequency of venereal diseases among the drafted soldiers and school ratings, 1900 ..... $r = 0.57$
48 states, inverse rating as birth-states of Federal prisoners and school ratings, 1900 ..... $r = 0.51$

It has already been pointed out that interstate migration will affect comparisons between school conditions a generation ago and present-day measures of intelli-

[1] The relative infrequency of venereal diseases among the states' draft quotas shows a correlation of 0.74 with the per cent of soldiers making A and B grades on the Alpha Tests (whites only). Infrequency of homicides is correlated 0.41 with A and B alpha scores, and the inverse ranking of the birth-states of Federal prisoners is correlated 0.37 with the same measure. The corresponding correlations with magazine-circulation are somewhat higher in all cases.

gence, economic efficiency, and morality. In our earlier studies, this factor was in part eliminated by considering only the states in which at least 55 per cent of the population (Census of 1910) was native to the state. There were 26 such states to which all of our measures could be applied, and in the earlier studies all correlations that would be affected by the migrant population were significantly increased with this reduction in the number of states considered. A similar increase in resemblance is found in the case of the three moral measures when the comparisons are limited to these 26 states:

26 states, with relatively stable populations:
Inverse ranking of states as birth-states of Federal prisoners,[1] correlated with school ratings,[2] 1900..... $r = 0.59$
Infrequency of venereal diseases among soldiers, correlated with school ratings, 1900..... $r = 0.72$
21 of the above states in the registration area:
Infrequency of homicides, correlated with school ratings, 1900..... $r = 0.73$

While, by taking only the states with relatively stable populations, we find that the resemblances are significantly increased for the measures that are affected by the factor of migrant population, they are still much less marked than the corresponding resemblances between the school rankings of a generation ago and present-day measures of intelligence, economic efficiency, and leadership; (for the 26 states in question, these range between 0.88 and 0.97). This difference may be merely accidental; or it may be due to the relative inaccuracy of the moral measures as compared with the measures of other qualities; or it may mean that the schools, while

[1] The factor of migrant population, of course, does not affect to any great extent the rankings based on birth-state data.

[2] The school ratings here used were based on a modified form of the Ayers Index Numbers as described in the earlier study, "Do Good Schools Pay?"

doubtless exerting a positive influence on morality and respect for law, either are not influencing these qualities in the same degree that they are influencing intelligence, efficiency, and leadership, or are more seriously counteracted in their influence by other forces—such, for example, as climate, race, and heredity.

In studying the distribution of the states on the moral measures, probably the most significant evidence of the influence of education is found in the uniformly high stations which the New England states hold. With reference to infrequency of homicides (which is apparently our most reliable moral measure), the 6 New England states are among the first 8 out of the 34 making up the registration area. With reference to the relative infrequency of venereal infection among their soldiers, 4 of the New England states are the first 4 among 48, another is among the first 9, and all are among the first 13. As birth-states of Federal prisoners (on the inverse ranking), the 6 New England states are among the first 15 out of 48.[1]

The educational significance of the consistently high standing of the New England states on all of the moral measures, as well as on most of the intelligence, efficiency, and leadership measures, lies in the fact that these states not only have had good schools, but also a very serious handicap which their schools have apparently overcome in a quite remarkable way. All of these states except Vermont and Maine have had a very heavy burden of immigration to assimilate—Rhode Island,

[1] As birth-states of leaders ("Who's Who in America," 1924–25) the six New England states are among the first 10 out of 47; on "thrift-ratings," (ratio of *per-capita* savings to *per-capita* income) they are the first 6 states among the 48; on a rating representing the combination of scores on 10 measures of intelligence, leadership, morality, and economic efficiency, the 6 New England states also lead all of the others. (See Appendix.)

Massachusetts, and Connecticut surpassing all other states in the extent and perhaps (in recent years) in the character of this handicap. Even Maine has an immigrant population in excess of the national average, and Vermont almost reaches the national average. During the past century, too, all of these states have contributed to the population of the Western states large segments of their original Nordic stock.

Next to the New England states, the state that seems most consistently to hold a high position on our moral measures is Wisconsin. On two of the measures, she is number 6 and number 8 respectively among the 48 states; with reference to infrequency of homicides, she is number 3 among 34 states. Minnesota also maintains consistently a relatively high position.

The states that seem to be most seriously displaced on their moral ratings as compared with their educational, intelligence, efficiency, and leadership ratings are California and Ohio. The data from the Federal penitentiaries suggest that California's low station on two of the moral ratings may be explained, in part at least, by the Mexican and oriental elements in her population.

From the educational point of view, it is somewhat disquieting to note that the levels of schooling represented by the prisoners committed to the Federal penitentiaries in the first six months of 1923 are far higher than the corresponding levels represented by the general population. Sixty per cent of these prisoners reported a sixth-grade education or better; 33 per cent, an eighth-grade education or better; 14 per cent a twelfth-grade education or better; 9.5 per cent had attended college; and 3.1 per cent had attended college four years or more. It should be remembered, however, that the prisoners referred to here were convicted for the viola-

tion of Federal laws, and that such crimes as counterfeiting, bank-defalcations, the fradulent use of the mails, and the more profitable types of smuggling are not crimes that appeal either to stupid or to unlettered criminals.[1]

VI

Summary, Conclusions, and Comments

The present study has been based upon the belief that the results of mass-education should be revealed in mass-conduct, and that measures of such results should be sought in social statistics.

Evidence has been submitted in earlier studies showing a high degree of probability that the relative standing of the states with respect to present-day measures of intelligence, economic efficiency, and leadership can be attributed in large part to the facilities for mass-education afforded by these states a generation or more ago.

The three measures of mass-morality described in this paper are also seen to have a positive relationship to the school facilities provided a generation ago. The resemblances between the school ratings and the moral ratings are not so close, however, as are the resemblances between the school ratings and the ratings that reflect intelligence, efficiency, and leadership.

Perhaps the most impressive evidence pointing to the positive influence of mass-education is the high rank of the New England states on all of the moral measures

[1] The educational status of prisoners in State penal institutions is probably much lower than in the Federal institutions. In the New York State prisons, for example, the following data were found in 1919: 42 per cent of the prisoners had six or more of schooling; 13 per cent, an eighth-grade education or better; 6.8 per cent, eleventh-grade or better; 3.0 per cent had attended college.

and on most of the other measures—a rank that has been maintained in the face of the severe handicap imposed by the continuous westward emigration of the native stock and the replacement of this stock by a supposedly less desirable type of immigrant. There is, too, in the high standing of the New England states on the "moral counts," a suggestion that the *quality* as well as the *quantity* of mass-education must be taken account of in determining the relation of education to morality.

The problem of developing basic "moral controls" is one that may well engage the attention of American teachers. The seriousness of the problem is indicated by the unchecked increase in homicides and other serious crimes and by the contrasts of our country with other civilized countries with respect to the prevalence of serious crime.[1] The difficulty of solving the problem is complicated by a veritable multitude of factors: climatic influences; inherent racial traits; the apparent decline of religious sanctions or at least the diminished force of religious inhibitions;[2] the mobility of the populations; and above all, perhaps, the continued and unprecedented increase in *per-capita* wealth and the consequent encouragement of a "national philosophy" which intensifies individualism, condones gratification, and tends to discredit sacrifice and renunciation. Education has demonstrably contributed to the increase in *per-capita* wealth; it has had its share in dethroning authority and

[1] "In all England and Wales in 1921 there were 95 robberies; in 1922, in New York City alone, there were 1445 robberies, and in Chicago, 2417."—*Police Journal* (official organ of the National Commission on Police Welfare), Vol. XII, No. 1, Jan., 1925, p. 23.

[2] It is noteworthy, however, that the correlations of the "moral" ratings with the per cent of total population reported as church-members (1906) while positive are *very much lower* than are the correlations of the moral ratings with school-ratings for 1900.

superstition and in enthroning freedom and reason. But if education would increase wealth, it must also guard against the increased moral hazards that wealth involves; if it would enthrone freedom and reason, and dethrone authority and superstition, it must do its best to develop rational controls of conduct which will have the positive and direct influence that authority and superstition once exerted.

Finally, if carefully wrought programs looking toward a solution of the problem are not provided by the educational profession, they will be provided by other groups and forced upon the schools. There are many evidences that "lay" programs are even now in the making. Almost inevitably they will be reactionary in their character and futile in their influence. Only constructive programs that will look forward and upward can be adequate—and these the profession itself must provide.

CHAPTER VI

THE ARMY TESTS AND THE PRO-NORDIC PROPAGANDA[1]

The book[2] under consideration in this paper is an interesting expression of the mental attitude against which the present writer protested in his discussion before the Society of College Teachers of Education in 1922.[3] Inasmuch as he was accused at that time of "attacking a straw man," and particularly of emphasizing grotesque misinterpretations of the results of intelligence tests as seen by lay students of the problem, he may be permitted now to claim a full confirmation of his forebodings in this work of a recognized psychologist.

This is not to say, however, that Professor Brigham's work is barren of merit, or that the message that it conveys is not, from certain points of view, salutary and timely. He deals primarily with the implications of the Army intelligence tests as they affect the problem of immigration. Even from the point of view of the "rational equalitarian" (if I may so characterize the position that, in a very inadequate way, I have been trying to represent), the dangers of unrestricted immigration are unquestioned and the undesirable quality of much of our recent immigration is conceded. But one

[1] Reprinted with the courteous permission of the publishers, Messrs. Doubleday, Page and Co., from *The Educational Review*, April, 1923.

[2] Brigham, Carl C.: *A Study of American Intelligence*. Princeton: Princeton University Press, 1923.

[3] See Ch. I.

may believe all this without claiming for the Army tests a validity as accurate indices of native intelligence which they do not possess; and one may certainly believe all this without identifying one's self with that "parlor" cult of ku-kluxism of which our radical pro-Nordic propagandists constitute the mother-klan. To recognize unrestricted immigration as an evil is one thing; to fan the fires of race-prejudice with alleged scientific findings is quite another.

Part I of Professor Brigham's book shows the author at his best when he describes clearly and in non-technical terms the two group-examinations,—Alpha and Beta, given respectively to the literate and illiterate soldiers—and the individual examinations based on the Stanford-Binet tests. Much less clearly this section of the book discusses the reliability of the Army tests as measures of native intelligence.

Part II very briefly sets forth the contrasts in intelligence-levels between the officers and the enlisted men, and between the whites and the negroes. It then proceeds to treat in detail the test-findings for the several groups of the foreign-born draft. Following this is a discussion of the race-hypothesis, the most important part of which (indeed, the key-section of the entire book) is a table that purports to reveal the relative proportions of Nordic, Alpine, and Mediterranean stock among the nationalities represented in the foreign-born draft. Section X contains supporting evidence drawn from studies of other types—chiefly quotations from pro-Nordic writers. The section devoted to conclusions presents as its most important feature a graph that is alleged to show the distribution of native intelligence among the following racial groups as revealed by the Army tests: "Total Nordic;" "Combined Alpine and

Mediterranean;" and "Negro." A large measure of over-lapping is revealed, the coincidence of the surfaces being fairly close in the case of the two groups last-named; but the Nordics are represented as by far the supreme racial stock. The final paragraphs are an appeal to the American people to put into effect rigorous policies of selective immigration and eugenic practices.

Professor Brigham's argument is built around three basic assumptions: (1) that the Army tests are trustworthy measures of native intelligence; (2) that the median scores made by national groups on the Army tests reveal true differences in national levels of native intelligence; and (3) that the proportion of Nordic blood in the foreign-born population can be identified on the basis of nationality-groups. I shall consider each of these assumptions in some measure of detail.

I

Professor Brigham's principal defense of the Army tests as true measures of native intelligence is based upon the fact that the scores correlate highly with schooling. "The best proof of the test series comes from a study of the relation between the intelligence ratings and education," he says (p. 62); and he cites in support of his statement the correlation, 0.75, between Alpha scores and "school grade completed," and the correlation, 0.67, between Beta scores and "school grade completed." His assumption is that native intelligence will determine the amount of schooling that one receives—apparently to such an extent as to render negligible all other factors, including opportunity and stimulus for schooling. Unfortunately his treatment of this crucial question is brief and (from the educationist's point of view) inexcusably amateurish. He refers to the facts of school elimination

(as shown by the Army data) in support of his contention that "school grade completed" is a measure of intelligence. He is apparently unfamiliar with the careful and extended studies that have been made of retardation, elimination, and persistence in school attendance, and which show very clearly that a veritable multitude of factors coöperate in determining whether an American child will have twelve, ten, eight, seven, six, or fewer years of schooling. He is apparently equally unfamiliar with the wide variations in school opportunity offered by American communities. Only under the condition that all of the individuals compared had had essentially equal opportunities for schooling could one conclude that native intelligence alone is reflected by differences in the Army scores.

Professor Brigham does not tell us how those who framed the Army tests attempted to account for differences in schooling and thus validate the tests as measures of native intelligence before they applied them on a wide scale in the training camps.[1] There are, however, certain comparisons between the scores made on the tests by officers and the scores made by enlisted men which the Army report cites as conclusive evidence that differences in the scores were not fundamentally affected by differences in schooling. These findings Professor Brigham quotes (p. 64) as the "crucial test" of the assumption that the Army scores actually reveal the levels of native intelligence reflected in the military draft.

Unfortunately for Professor Brigham's hypothesis, this "crucial test," when analyzed, loses entirely its "crucial" character. The facts that he cites are these: While most of the officers tested were highly educated, 660

[1] I have referred briefly to this attempted validation in Ch. IV.

officers were found who had not progressed beyond the eighth grade of the elementary school; and, while most of the enlisted men had had relatively brief schooling, about 14,000 reported varying degrees of education beyond the eighth-grade level. Here, then, are two groups; one apparently a group of naturally bright men who with limited education have demonstrated sufficient intelligence to win commissions; the other apparently a group of dull men who, in spite of a generous educational equipment, were none the less handicapped in intelligence. The Army report lays great emphasis upon the fact that the scores made by each of these groups, when distributed on a frequency surface, show practically identical curves with a slight superiority for the officer group; hence the conclusion, "It is evident then that the examination is measuring other qualities, in which officers stand above recruits, to a greater extent than it is measuring education."[1]

At first glance, this evidence seems overwhelming; but when one examines the data carefully, the contention that they validate the Army tests as measures of innate intelligence is very far from convincing. If selection for a commission is proof positive of greatly superior intelligence, and if the tests measure intelligence unaffected by differences in school opportunity, then the scores of these two groups, instead of showing practically an identical distribution, should reveal a marked superiority of the officer-group. From this point of view, then, the "crucial test" proves far too much. Education apparently has lifted a dull group to the level of intelligence represented by a naturally bright group. This is by long odds a greater recognition than the environmentalist has heretofore gained from the determinist.

[1] *Memoir XV* of the National Academy of Sciences, p. 778.

But this is not all. The curves published in the Army report (p. 779) and copied by Professor Brigham in his book (p. 65) would tell a different story if drawn in another way. When one goes back to the original data from which the curves were drawn, one finds that the differences between these two groups in schooling are far less significant than either the Army report or Professor Brigham's discussion leads one to suspect. An overwhelming majority of the officers (almost seventy per cent) *had completed the eighth grade*, while nearly half of the enlisted men *had been limited to ninth-grade and tenth-grade education*. Thus instead of a striking contrast between a relatively uneducated group of officers and a highly educated group of enlisted men, we have merely an interesting comparison between two groups that in the mass differed very little in respect of intelligence and are now seen to have differed very little in schooling. There is an abundance of evidence that one year's or two years' difference in schooling may make no difference whatsoever in the amount of education actually acquired. The number of days constituting the average "school year" in 1900 varied from 70.5 in North Carolina to 191 in Rhode Island, hence the actual time in school represented by those who reported eight years' schooling may have varied from 564 days to 1528 days,[1] or from 3.1 *school years* of thirty-six weeks each to 9 *school years* of thirty-six weeks each — all passing muster as "eight years of schooling completed"! Furthermore, it has been found, even in a state like New York where the rural and urban schools are in session approximately the same number of days each year, that eight years' schooling in the one-room rural schools insures no greater gain in educational achievement for the average pupil in typical subjects than seven years' schooling or

[1] See Report of U. S. Commissioner of Education for 1900.

even less will insure in urban schools.[1] In every way, the fallacy of taking a mere statement of "grade of school completed" as an adequate index of schooling is obvious.

Why the Army report failed to set forth more trustworthy comparisons relative to the probable influence exerted by schooling upon the Army scores is to my mind incomprehensible. I have shown in earlier studies[2] that the variations among the median scores made by state contingents of troops on the Alpha tests resemble almost perfectly the variations among these states in school efficiency, and that this resemblance is uniformly closer for the years when the drafted men were in school than for any other years. By using measures of present-day intelligence-levels and efficiency-levels (other than the Army scores) I have been able to demonstrate that good schools have by far the best claim to a causal influence in determining all the resemblances disclosed. In other words, however reliable the Army tests may be as measures of differences in native intelligence when applied to groups that are homogeneous with respect to educational opportunities, they have no reliability whatsoever as measures of intelligence-levels when applied to groups so large and so heterogeneous educationally as were the state contingents of recruits in the drafted army. *When applied to such groups, the tests become in an outstanding fashion measures of educational opportunity.*

II

Professor Brigham's primary concern is not with state groups, but with national groups. It is to be inferred, then, that the wide difference in median scores upon which he lays so heavy an emphasis reflect equally wide

[1] See *Rural School Survey of New York State*, Ithaca, 1922, ch. IX.

[2] See Ch. IV

differences in educational opportunity and can be adequately explained by reference to this factor. I shall now consider the facts that abundantly confirm this inference.

Professor Brigham compares sixteen nationalities represented in the foreign-born draft. These men had been resident in the United States for varying periods of time. Some of them took the Alpha tests and some the Beta tests, while from both groups a few were given individual examinations. On a scale combining all three types of tests, Professor Brigham gives the median scores of those who had lived in the United States over twenty years; of those who had been residents between 16 and 20 years; between 11 and 15 years; between 6 and 10 years; and between 0 and 5 years. He finds (p. 89) that "from 0 to 20 years of residence, the average rises steadily and the variability becomes less and less." It is clear, then, that the foreign-born recruits who had been in the country the longest made, as a group, the highest scores. But it is also clear that most of those who had been residents for sixteen years or more had attended American schools (remembering that the draft affected only those between the ages of 21 and 31). It would be reasonable to conclude, then, that the superior scores of longer-residence groups were due in part to American schooling. While Professor Brigham does not refer to the probable attendance of these longer-residence recruits in American schools, he does recognize the possibility of an "educational" factor. This, however, he completely rules out by reference to the fact that the differences hold as well for those who took the Beta tests as for those who took the Alpha tests. Because he believes that the Beta tests could have been affected in no possible way by schooling, he contends that the findings justify only one conclusion—namely,

that the recent immigrant-groups are of inferior *native* intelligence.

The argument that Beta-test scores are unaffected by schooling is, of course, inadmissible. As Professor Brigham himself points out, there is a correlation of 0.67 between Beta scores and "school grade completed;" and any unprejudiced person who examines the Beta materials must admit that school training would be a factor in determining median scores if two groups, one entirely without school training and the other with reasonably good school education, were subjected to the tests. This is precisely what happened in the army. Large numbers of recruits who had had good schooling in non-English speaking countries took the Beta tests, along with large numbers of native-born and foreign-born illiterates who had had little or no schooling. Recent immigration has come most largely from countries where school facilities are relatively meager—most recently from countries that are very backward educationally; hence the gradual decrease in the Beta scores as we reach the more recently arrived immigrant-groups can be explained with a thoroughgoing consistency by reference to the educational factor.

I now pass to Professor Brigham's discussion of the national levels of intelligence as reflected by the Army scores. On his combined scale, the principal nations represented in the foreign-born draft rank as follows: England, Scotland, Holland, Germany, Denmark, Canada, Sweden, Norway, Belgium, Ireland, Austria, Turkey, Greece, Russia, Italy, Poland. More than three fourths of the cases considered by Professor Brigham fall in the "late-arrival" groups and could have been affected little if at all by American education; hence if education had any influence upon the scores, this influence must be traced to the schools (and, of

course, to the elementary schools) provided in the countries from which the soldiers came. Taking my data from the Report of the United States Commissioner of Education for 1912 (which gives the ratio of elementary-school enrollment to total population in foreign countries for the year 1910 or thereabouts), and checking the figures (in some cases with slight changes) by data contained in the *Statesman's Yearbook*, I find between the above "intelligence" ranking and the "school" ranking of the same countries, a correlation of 0.84. In this computation I placed Turkey at the foot of the list in school facilities because no school data for Turkey were available. The fairer way would be to omit Turkey. If this is done and if the proportion of "A" and "B" men is made the basis of the intelligence-ranking, the correlation of "intelligence" with elementary-school facilities reaches the very impressive magnitude of 0.91. This is a shade higher than the corresponding figure for the twenty-six American states that have populations sufficiently stable to permit comparisons to be drawn between present levels of intelligence and school conditions a generation ago.[1]

I have already demonstrated that differences found among the median scores of contingents of recruits from American states can be amply explained in terms of the educational facilities afforded by these states. I submit that the same explanation will hold with even greater force for the differences found among the various nationalities represented by the foreign-born draft. This is not to say that there are not in both cases real differences in the group-levels of native intelligence. These differences, however, have yet to be demonstrated. It is certainly clear from my earlier findings that, if all of the American states had had in 1900 school systems as

[1] See Ch. IV.

efficient as were those of Massachusetts, Connecticut, and California at that time, the level of native-born American "intelligence" as revealed by the Army tests would have been substantially higher and the differences among the states far less in magnitude. It is an equally safe inference that, if all of the nations contributing to recent American immigration had had a generation ago elementary schools equal to those of England, Scotland, Holland, and Germany, the "intelligence" differences found by the Army tests and emphasized by Professor Brigham would have been reduced to a negligible minimum.

III

Let us now consider the basis of Professor Brigham's claim that the Nordic race represents the highest levels of native intelligence, and the correlative confirmation of Mr. Madison Grant's contention[1] that the long-headed blonds are beyond doubt the Chosen People and should proceed forthwith to the full enjoyment of their heritage —the earth.

Professor Brigham here depends upon arguments that are even more questionable than those which he advances in the earlier sections of his book. He constructs (p. 159) a table which purports to know the relative proportions of Nordic, Alpine, and Mediterranean stock in each of the important national groups. Sweden stands first with one hundred per cent of Nordic blood; Norway follows with ninety per cent; then come Denmark, Holland, and Scotland with eight-five per cent each; England, eighty per cent; British North America and Belgium, sixty per cent; Wales and Germany, forty per cent; France and Ireland, thirty per cent;

[1] Grant, Madison: "The Passing of the Great Race." New York, 1916.

Poland and Spain, ten; Italy, Russia, and Portugal, five per cent; Greece, Rumania, and Turkey, no per cent. (Inasmuch as Alpines and Mediterraneans are lumped together in his conclusions, we need not trouble ourselves with the relative proportions of these two strains.) This table, Professor Brigham says, was worked out "in collaboration with students of this subject" and is "only an approximation to the truth." He does not hesitate, however, to draw some very important and sweeping generalizations from this "approximation."

As to the relative intelligence of the three groups as thus distributed among the different nationalities, Professor Brigham finds that 12.3 per cent of the English-speaking Nordics were "A" and "B" men; 8.1 per cent of all Nordics; 5.7 per cent of non-English speaking Nordics; 3.8 per cent of Alpines; and 2.5 per cent of Mediterraneans. A high correlation between "Nordicism" and "intelligence" is thus apparently established. In spite of clear evidence of the operation of a language factor (note the difference between "English-speaking Nordics" and "all Nordics"!) Professor Brigham concludes that "the underlying cause of the nativity differences . . . is race, and not language" (p. 174). The educational factor he does not mention in this connection, for he has already demonstrated to his own satisfaction that education is a result and not a cause of intelligence; hence, even if one were to contend that the superior schools of the non-English speaking Nordics made a significant difference, Professor Brigham would rule out the contention *instanter*. In fact he says (p. 194):

"If intelligence counts for anything in the competition among human beings, it is natural to expect that individuals of superior intelligence will adjust themselves more easily to their physical and social environment, and that they will endow their children

not only with material goods, but with the ability to adjust themselves to the same or a more complex environment . . . In the same way, our educational institutions are themselves a part of our own race heritage."

Now if Professor Brigham had followed his analysis of the Army report a little further, he would have found evidence that would either annihilate his assumption that "intelligence" is not affected by schooling or completely reverse his conclusions regarding the alleged supremacy of the Nordic stock. For example:

1. While no one can seriously doubt the general superiority of the whites over the negroes in native intelligence, the Army tests show clearly the tremendous influence of good schools in stimulating the growth of intelligence and the corresponding handicap imposed by poor schools. On pages 724–25 of the Army report will be found tables that distribute by states the scores made by literate negroes on Army Alpha. After computing the medians one finds that the literate negroes from Illinois not only surpassed the literate negroes from the South but also achieved a median score above the median scores of the literate whites from nine Southern states; that the literate negroes from New York surpassed the literate whites from five Southern states; that the literate negroes from Pennsylvania surpassed the literate whites from two Southern states; while for all Northern negroes reported, the median Alpha score surpasses the median Alpha score for the whites of Mississippi, Kentucky, and Arkansas.

In view of the fact that the Southern whites, according to Professor Brigham's method of determining Nordicism, represent about the purest Nordic stock in the country, two alternatives are open: either (*a*) he must grant that schooling *did* affect the intelligence-ratings, or (*b*) he

must admit that the theory of Nordic supremacy is untenable.

2. Massachusetts and Connecticut have been literally overswept by a Mediterranean tide. In Massachusetts, for example, nearly one third of the present population is both foreign-born and heavily Mediterranean; and more than another third represents the second and third generations of similar immigrant stock. An analogous condition exists in Connecticut. And yet Massachusetts and Connecticut stand right up in the front rank among the forty-eight states on the Alpha tests as well as on every other measure of intelligence and efficiency that I have been able to apply.[1] They are surpassed only by the far-western states and on some counts not even by these. What happens to the claim of an inevitable Nordic superiority in the light of such a comparison?

3. If the Nordic stock is so far and away superior in native intelligence and if (as Professor Brigham infers) superior native intelligence will inevitably provide good schools as part of the "heritage" that it passes on to its children, how comes it that the states in which the white population shows the highest proportions of Nordic blood have both the poorest schools and the lowest white "intelligence" as measured by Army Alpha, by adult white literacy, by the distribution of public libraries, by the proportion of leaders produced, and by every other standard that has been suggested?

4. If Professor Brigham will compute (using his own interesting formulæ) the per cent of Nordic blood in the white populations of the several states and then correlate "Nordicism" as thus determined with white intelligence as indicated by Army Alpha (or any like measure) he will obtain a very respectable *negative* correlation (around

[1] See the state-ratings included in the Appendix.

−.50). In other words, if Professor Brigham's assumptions and methods are valid, the actual facts revealed by the Army tests prove just the reverse of the contention that he has set forth. Truly one may understand how William James felt when he wrote, a quarter of a century ago, "If the Anglo-Saxon race would drop its sniveling cant it would have a good deal less of a 'burden' to carry."[1]

If we pass to Europe, we might ask Professor Brigham to explain why one of the most stable and promising nations in Europe to-day is Czechoslovakia—a country the dominant peoples of which are listed by Mr. Madison Grant[2] as true Alpines, closely akin to the Poles whom Professor Brigham apparently regards as the last word in Alpine inferiority.

I have no doubt that the pro-Nordic enthusiasts have plausible explanations for all of these apparent inconsistencies. The Irish, Italian, Hungarian, Greek, Portuguese, and French-Canadian elements in Massachusetts and Connecticut may be Nordics in disguise. The tall, long-headed, blue-eyed whites that people the Southern uplands may, for aught I know, be transformed overnight into stubby Alpines or swarthy Mediterraneans, and thus save the "Great Race" from the stigmata of illiteracy and low Alpha scores. The negroes who came North, and whose children trained in Northern schools made as a group better Alpha scores than many of the Southern whites, may have been pale negroes with strong admixtures of real Nordic blood. And Czecho-Slovakia, now that it has achieved a highly distinguished place among the nations, may suddenly be revealed as a Nordic island, surrounded on all sides by Alpine seas of

[1] James, Henry: (*ed.*), *The Letters of William James*, Boston, 1920, Vol. II, p. 88.

[2] Grant, Madison: *The Passing of the Great Race*, New York, 1916, p. 128.

Croats, Wends, Serbs, and Magyars. The collective imagination of our pro-Nordic writers has already demonstrated its agility; what it may be able to do when pressed I cannot venture to predict.

In the meantime, those of us whose imaginations are cribbed and confined by a prejudice in favor of facts will find in good schools and an effective educational stimulus an explanation for these phenomena that is reasonable, hopeful, and humane. Massachusetts and Connecticut have kept up the ideal of good schools, and while they have been overswept by a Mediterranean tide, and while they have sent to the Western states innumerable scions of their original Nordic stock, they still maintain a high rank among our most intelligent commonwealths. Can any one doubt that they will retain their leadership if only they keep alive their faith in good schools? The Nordics in the Southern states, even when playing the rôle of a dominant race, have discovered that without good schools both for their own children and for the children of the subject race, they are hopelessly handicapped in competition with the "Mediterraneans" of New York and New England and the "Alpines" of the Middle West. And as for Czechoslovakia, the clear explanation of her present status is to be found in a tradition of mass-education which dates from the era of Comenius and which, long before the outbreak of the World War, had given a Moravia, Bohemia, and Silesia a literacy rating almost unsurpassed on the Continent.

Professor Brigham's study appears, then, as a most questionable and biased interpretation of certain facts that can be far more reasonably interpreted in quite another way. Because he has not adequately set forth this alternative interpretation, and particularly because he makes no mention of the mass of evidence that sup-

ports it, his efforts must be regarded as either misinformed or prejudiced. Furthermore, of his two basic assumptions—the validity of the Army tests as measures of native intelligence-levels especially when applied to large heterogeneous groups, and the alleged percentile distributions of racial stock among national groups—the first has been proved to be a fallacy, and for the second not an iota of respectable evidence has been presented. Finally, from the ethical point of view, his conclusions, even if backed by evidence far more convincing than that which he sets forth, suggests no possible solution short of measures which, if put into effect, would quickly entail an inter-racial war. Into such a maelström, pro-Nordic propagandism is certainly heading.

Against this drab picture, I may be permitted to project the constructive program of the rational equalitarian. Because it is rational this program does not quarrel with facts; hence it does not deny racial differences in intelligence-levels.[1] It recognizes a fair degree of probability that the Negro race will never produce so large a proportion of highly gifted persons as will the white races. It recognizes a possibility that certain of the white strains may be more prolific in talent and genius than certain others; but it also holds that, in the present state of knowledge, invidious distinctions cannot safely be drawn among Nordics, Alpines, and Mediterraneans in this regard. It holds furthermore that the level of effective intelligence in any group of whatever race can be substantially raised through education. In support

[1] As this book goes to press I am informed by Dr. Harold Rugg, who directed the testing-program in the recent Philippine school survey, that the results of the survey raise serious doubts of the existence of racial differences in innate intelligence in so far as the numerous racial elements represented by the Philippine population are concerned.

of this tenet it cites the investigations which prove beyond cavil that schooling exerts a positive and powerful influence in stimulating the growth of native intelligence.[1]

Resting his case upon these facts and assumptions, the rational equalitarian proposes: (1) a vast extension of educational facilities and a far-reaching refinement of educational materials and methods; and (2) among other objectives, the direction of educational agencies toward (a) the establishment of the ideal of race-purity in all major races, and (b) a voluntary acceptance of eugenic practices to the end that, *in all races*, the reproduction of less worthy stock may be reduced. He holds that coercion can never accomplish the ends that eugenics seeks but that appropriate education may lead to the desired practices. He holds especially that to seek these ends through either the annihilation or the subjugation of certain races would sound the death-knell of any race that undertook it. He holds, then, that whether his proposals will work or not (and the clear indications are that they will work), they constitute the one and only hope of humanity.

The rational equilitarian, as we have said, does not quarrel with facts. Recognizing racial *differences* for what they are, he builds his program upon the far more numerous *resemblances* that now exist, and upon the already demonstrated possibility of multiplying such resemblances. Instead of emphasizing the forces that pull men apart, he would emphasize the forces that draw men together. Instead of intensifying biological differentiation, he would stimulate cultural integration. He believes that diverse racial stocks can learn to live

[1] See the summary of recent investigations touching this problem in Ch. VII.

together and to work together without necessitating a blend of blood, and that undesirable blends of blood can be prevented through education. His program, as compared with that of the radical hereditarian, promises to do all that the latter would do in promoting human evolution. It differs from the program of the hereditarian in being more nearly consistent with the observed facts, in being clearly in harmony with the ideals of humanity and democracy that have been winnowed and refined through the ages, and above all in being workable. The hereditarian's solution of the problem is intolerant of the facts that do not support it; it is openly inhumane and blatantly anti-democratic; and to make it work would involve an upheaval beside which the late war would look like an afternoon tea.

CHAPTER VII

TO WHAT EXTENT IS EDUCATION A CREATIVE AND AN EQUALIZING FORCE?

A considerable volume of water has flowed under the bridge since the anathemas of the determinists fell upon the head of the present writer for his presumption in questioning their hypotheses. First came the flood of lay interpretations of the Army tests which showed how seriously the intelligent public took what the determinists tried to laugh off as a "man of straw."[1] Then

[1] To *School and Society*, Oct. 14, 1922, Dr. R. R. Rusk, an English psychologist whose alleged statements regarding the limitations of education I had quoted in my paper before the Society of College Teachers of Education, (see Ch. I, above), contributed a somewhat fiery disclaimer, maintaining that I had taken the statement from an English journal, which had lifted it from another journal, which had in turn reported Dr. Rusk's remarks inaccurately. Dr. Rusk apparently overlooked the fact that the "relayed" character of the statement was made clear in my citation, and the further fact that my point in quoting it was simply to show the readiness with which the public would draw fatalistic inferences from such remarks as the determinists had been making, whether the inferences were justified or not. It is rather unfortunate, I think, that Dr. Rusk, in making his disclaimer, did not enlighten us as to just what he did say on the occasion in question. H. C. Hines in commenting on this episode (*Measuring Intelligence*, Houghton Mifflin, 1923, p. 135) makes the following comment: "Rusk may well have turned his attention to President Cutten's address as a sample of the Platonic attitude toward an educational caste system. He is not minimizing the strength of Bagley's arguments . . . For it was this type of assumption given wide publicity by President Cutten that Bagley was attacking. Rusk seems to have reached over the head of Cutten to 'get back' at Bagley."

came a stream of articles and books by recognized psychologists who, just as naïvely as the laymen, assumed the validity of the assumption that the tests actually measured pure native ability unadulterated by the base products of democratic schooling,—a stream which culminated in the somewhat turbid deductions referred to in Chapter VI.

From the point of view of a real solution of the problem, however, these floods and streams were after all but superficial currents. Less spectacular but far more significant have been the investigations, many of them stimulated by the gross fallacies so apparent in the earlier literature, that have been undertaken during the past four years actually to measure the contribution that education makes to the complex known as general intelligence. The present paper will briefly summarize the more important of these investigations, and will also include a reference to the related studies which have now thoroughly discredited the determinists' contention that individual differences are inevitably widened by training,—the investigations which prove that education, under certain conditions at least, actually operates as a "leveling-up" agency.

I

Reference has already been made[1] to Cyril Burt's monograph, "Mental and Scholastic Tests," issued by the London County Council in 1921. Burt's results until recently have attracted little attention in this country, notwithstanding the fact that they were quite sufficient in themselves to leave the determinists' basic hypothesis open to the gravest suspicion, and notwithstanding the fact that they were cited by at least two speakers at the Chicago meeting in 1922.

[1] See above. Chapter IV, pp. 75f.

What Burt did was to apply to adolescent children two series of mental tests,—the Binet-Simon tests and a set of tests which he constructed himself and which he had reason to believe were rather more accurate measures of native intelligence,—and a series of educational or "achievement" tests which measured the school attainments of these children. He also made a record of their chronological ages which he assumed to be a measure of "that fund of wisdom (or some fraction of that fund) which from his cradle onward is amassed by every child, whether intelligent or unintelligent, whether an incorrigible truant or a daily attendant at school." Burt refers to this factor only as "chronological age," but it is clear from his definition that the term "informal education" (contrasting with the formal or systematic education represented by school attainments) might well be applied to it.

By applying the technique of partial correlations and the regression equation to the several ratings of the children thus secured, Burt computed the relative influence of three possible components on the Binet-Simon scores as follows:

To the "mental age" of the children tested as measured by the Binet-Simon scores:

Native intelligence contributed	33 per cent
Informal education contributed	11 per cent
Formal education (schooling) contributed	54 per cent

The general conclusion[1] that Burt reached from his investigations is well worth quoting:

"There can . . . be little doubt that, *with the Binet-Simon scale, a child's mental age is a measure not only of the amount of intelligence with which he is congenitally endowed, not only of the plane of intelligence to which in the course of life and growth he has*

[1] Burt, C.: *Mental and Scholastic Tests*, London, 1921, pp. 182ff. (Italics in original.)

eventually arrived; it is also a measure, largely if not mainly, of the mass of scholastic information and skill which, in virtue of attendance more or less regular, by dint of instruction more or less effective, he has progressively accumulated in school.

"*In determining the child's performance in the Binet-Simon scale, intelligence can bestow little more than half the share of the school, and age* [informal education] *but one third the share of intelligence* . . . Imagine two children, aged seven and seventeen respectively but possessing an intelligence equal normal, neither having passed a single hour in school. The younger . . . might reach a mental age of six [when measured by the tests]; the older, despite ten years of seniority, barely that of nine, so barren is schooling deprived of opportunity."

In a rather striking way, Burt's findings and conclusions were confirmed by an investigation which was made independently and which followed a quite different method. D. W. Willard in 1922 reported the results that he had obtained through repeated applications of two forms of the Terman Group tests. In September, 1921, form "A" was given to 236 Seattle children, representing Grades VII to XII, inclusive; a little more than seven months later, form "B" was given to 216 of the same group. During these seven months, the children tested were found to have made significant progress as measured by the difference between the two sets of test-scores. An analysis of the curves of growth led Willard to certain conclusions,[1] among the more important of which were the following:

"The presence of growth in considerable quantities for all ages and all classes gave evidence of the effect of the environment irrespective of native capacity.

"On the whole, about half the growth measured by the tests for all the grade-groups appeared to be due to the development of native capacity; and about half was due to training. The proportion in favor of training tended to be more than half for the

[1] Willard, D. W., in *School and Society*, Vol. XVI, No. 418, Dec. 30, 1922, pp. 750ff.

upper grades [cf. Burt's findings with adolescent children] and less than half for the lower grades . . .

"The function of the environment in determining test-scores is important enough to invalidate many comparisons that might be made between groups in different schools, or groups tested at different times, to determine relative mental ability. Such comparisons are valid only for pupils tested at the same time, and within the same environment, unless the variability due to environment has been counteracted."

Three months after the appearance of Willard's report, Wendell White published[1] a study in which the effect of systematic training in silent reading was shown to be clearly reflected in the scores made on the Otis Group Tests. The procedure was on the basis of parallel groups,—an "experimental" group which was subjected to the training in silent reading, and a "control" group which did not receive the training. Both groups were given the Otis tests before and after the training-period. Increases in the scores were found in both groups, but these increases were significantly larger in the group receiving the training than in the control group. White ventures the following conclusions:

"1. The net increases in scores made are due to the educational influence of the reading drills.

"2. The net increases in the scores made are all significant.

"3. The net increases in scores suggest that tests which require reading may be unreliable measures of natural intelligence."

Analogous in its methods and results to White's study is the investigation by Miss Katherine Graves, published in 1924.[2] Miss Graves showed that "coach-

[1] White, Wendell: "The Influence of Certain Exercises in Silent Reading on Scores in the Otis Group Intelligence Tests," *Educational Administration and Supervision*, Vol. IX, No. 3, March, 1923, pp. 179ff.

[2] Graves, Katherine B.: *The Influence of Specialized Training on Tests of General Intelligence*, New York, 1924, p. 44.

ing" on test-materials made notable contributions to the scores achieved by children on the tests, that some of these gains persisted at least over a considerable interval of time, and that exercises on materials related to but not identical with the test-materials also had a positive influence on the scores, although a slighter influence then the direct training.

Equally convincing are the results of an extensive study of the possibilities of training the intelligence of children of pre-school age, reported by Dr. Helen Thompson Woolley in 1925:[1]

" . . . a certain part of what we later call 'level of intelligence, may be due to the opportunities to learn given to young children. Very young children may show striking differences of intelligence quotient when placed in a very superior environment. We do not as yet know how permanent these increases are. What evidence we have shows that they tend to be maintained, although perhaps at not quite so high a level. Doubtless much will depend upon whether superior environment can be maintained over a long enough period to consolidate the gains . . . "

The findings of Visscher in his study[2] of the parents of the men and women listed in *Who's Who in America* are interesting in this connection. The principal occupational groups of the United States have apparently contributed to the list of present-day notables in the following proportions:

Unskilled laborers	1:37,500
Skilled laborers	1:1250
Farmers	1:550
Business men	1:62
Professional men (all types)	1:27
Clergymen	1:15

[1] Woolley: Helen T. "The Validity of Standards of Mental Measurement in Young Childhood," *School and Society*, Vol. XXI, No. 538, April 18, 1925, pp. 476ff.

[2] Visscher, S. S. in *Who's Who in America*, Chicago, 1924–25. Introduction; also *American Journal of Sociology*, March, 1925.

The superior chances of clergymen's children to achieve distinction may be due to superior heredity, but the environmental factor offers easily the simpler explanation, especially in view of Mrs. Woolley's findings. Clergymen not only have greater opportunities than most other men to give careful attention to their children's upbringing but the pressures that operate upon them to take advantage of these opportunities are also unparalleled in other occupational groups.

A most ingenious and convincing inquiry[1] into the effect of education on intelligence test-scores was reported in 1923 by Hugh Gordon, an English school inspector. This monograph, like that of Mr. Burt, has received scant notice from the American deterministsts. Burt had inferred from his findings that "mere growth" unaccompanied by school opportunities produced relatively little mental development. Gordon conceived the idea of comparing *apparently* low-grade intelligence-groups who had had little or no schooling with a *truly* low-grade intelligence group that had had school advantages. The former groups comprised physically-defective children, canal-boat children, and gypsy children; the latter group was made up of backward children enrolled in ordinary elementary schools. The Stanford Revision of the Binet tests was the basis of the intelligence examinations, and the intelligence quotients (termed "intelligence-ratios" by both Burt and Gordon) were determined in the usual way. Educational quotients (or "ratios") were also computed on the basis of achievement tests. Correlations of various types were made, the most significant, of course, being those between intelligence and school-attendance. An important purpose of

[1] Gordon, Hugh: *Mental and Scholastic Tests among Retarded Children; an Enquiry into the Effects of Schooling on the Various Tests*, London, 1923.

the investigation was to gain further light on the discrepancy between Burt's conclusions regarding the influence of schooling on the intelligence-scores and the "opinion held by many authorities" (we might add, by practically all of the leading American students of the problem) which Gordon exemplifies by the following quotation from Professor Terman's book, *The Intelligence of School Children:*[1]

"That the lack of schooling does not prevent a subject from earning an average or superior score in the test is shown by the cases of S. S. and Gypsy Mary."

From his study of the physically-defective children Gordon concluded that the low mental age represented by these children could be attributed neither to heredity nor to home environment, for both of these factors were not essentially different for the physically defective children and for the backward children attending an ordinary elementary school. Nor was there any evidence that the low mental age was due to the physical defects as a direct cause. By comparing the correlations between school-attendance, mental age, and educational age, however, it was apparent that the relatively brief time spent in school by most of the children (because of their physical defects) would clearly account for the low average mental age. Gordon closes[2] this section of his report as follows:

"The result of this investigation clearly indicates, so far as these tests are concerned, that the tests ('intelligence') are tests of school attainments; that, in fact, scholastic tests properly standardized for age do yield results that are for all practical purposes of equal value for determining so-called 'intelligence.' The lack of schooling has, in fact, affected equally both scholastic attainments and 'intelligence' (as found by test). That such scholastic attainments are in part due to real intelligence it is hardly necessary to add."

[1] Boston, 1919, p. 13.

[2] Gordon, *op. cit.*, p. 32.

The investigations on the canal-boat children furnished even more impressive evidence in support of the same conclusion. These children are almost entirely cut off not only from schools but from practically all contacts except with members of their own families. The situation is described in an official report by the Ministry of Health, which Gordon quotes:[1]

". . . the evidence is overwhelming and practically unanimous that under present circumstances Canal Boat Children are scandalously under-educated. When their manner of life is considered, it is not surprising; their only opportunities for schooling occur when the boats are tied up for loading or discharging, and the fact that many of the adult boat population are themselves unable to read or write has a tendency to make them lax in seeing that their children take full advantage of their opportunities . . . "

Concerning the social isolation of the children Gordon adds:

"When the boats remain in a town for loading and unloading, the children do not appear to mix readily with other children; they attend places of entertainment, such as cinemas, etc., and have money to spend. Many of the children are well dressed, clean, and appear fairly intelligent, although some of the older ones are undoubtedly very dull. The majority were found to be anxious to talk, but it was often difficult to understand what they said owing to their indistinct articulation and their use of unrecognizable words . . ."

And he adds by way of summary:

"To sum up, these children in respect to health, cleanliness, morality, feeding, etc., are fully equal, if not superior, to town dwellers of a similar character. That they are not mentally defective, as is generally understood by that term, is shown by the life and wages of their parents, who in many cases have had no education and can neither read nor write. Their intellectual life, on the other hand, is of a most meager description, owing to their lack of education and also owing to their social isolation."

[1] Gordon, *op. cit.*, p. 34.

When the intelligence-tests were applied to these children, the average intelligence quotient was found to be very low (69.6), or only a little higher than the average rating of children in schools for true mental defectives. The most significant finding, however, was that the intelligence-quotients of *children from the same families decreased steadily from the youngest* (of those tested) *to the oldest.* In other words, the youngest children tested (from four to six years old) compared favorably with children of the same pre-school age living under normal conditions, the average intelligence-quotient being 90 for this group, and the deviation from the normal (100) being perhaps explicable in terms of the social isolation already referred to. The oldest children tested (twelve to twenty-two years), however, had an average intelligence-quotient of only 60, or so far below average children of the same age living under normal conditions as to stamp them as distinctly subnormal. Inasmuch as these comparisons hold *within families* the conclusion is inescapable that the lack of schooling is the causal factor in producing the low "intelligence."

Gordon's interpretation[1] of his findings is illuminating:

"The fact that there is a marked decrease in 'intelligence' with an increase of age, and that this is especially noticeable among children of the same family suggests very convincingly that the low average 'intelligence' of these children is not due to heredity. It may be due to [social] environment, or to the lack of schooling, or to both combined. But as it has been shown that the correlation between the results of the mental and scholastic tests is very high, and further that the average ratios [quotients] for these two sets of tests are approximately the same, it may be assumed with some reasonableness that the lack of schooling has affected both 'mental' and scholastic attainments to the same extent . . . It is clear, however, that for the very young children there cannot be any educational tests, as such children have, as a rule, no so-called

[1] Gordon, *op. cit.*, pp. 44f.

scholastic attainments, and for this reason the 'mental' tests are necessarily not of the same character as those for the older children, and in consequence the children test normally. Without the mental effort or mental exercises associated with schooling it would appear that there has been very little mental development on the intellectual side. How far there has been a similar lack of development among these children in connection with problems touching their own special environment, it is difficult to say and, without tests especially devised and standardized for children in such surroundings, impossible to measure."

The results of the tests applied to gypsy children clinch in a very convincing way the conclusions drawn from the studies of the physically-defective children and the canal-boat children. The conditions under which these children live are described by Gordon as follows:[1]

"In the case of gypsy children also there has been a serious lack of schooling, and many attempts have been made to provide them with more education, but the question is surrounded by many and great difficulties due to the nomad habits of their parents . . . Gypsies seldom stay in one place for any considerable time, except perhaps during the winter months; at other times they are moving from place to place, fruit-picking and hopping . . . The attendance of the children at school is therefore very irregular and much broken up . . .

"Gypsies live mostly in a decrepit assembly of caravans and 'shacks' made out of odds and ends of wood and tarpaulins; the children sleep in 'queer arrangements' on the ground. There are, as a rule, no proper water supplies or sanitary conveniences . . .

"The children are 'dirty and insufficiently clothed'; they wear neither shoes nor stockings at home; they have good boots but take them off outside the school premises. The insufficiency of clothing is seldom due to poverty, as gypsies always appear to have money for bargaining and are prompt in the payment of fines . . .

"There is little crime among the gypsies, and no real evidence of intimidation . . . 'But they have rather primitive views as to the rights of property, especially in respect to what grows or moves upon the earth in a more or less wild state, and stick-cutting and poaching and petty pilfering are common enough.' . . .

[1] Gordon, *op. cit.*, pp. 46ff.

"As a rule, the children are absent from school from June to the middle of October; they only seek admission when caught, or when they hope to get assistance in meals or clothing . . .

"As to their conduct in school, teachers report it to be quite satisfactory, and that they give little or no trouble in obedience or behavior after they have been taught 'the essentials of truth and language.' . . .

"It seems to be the general opinion of teachers that little permanent improvement can be effected in the education of these children unless some sort of continuity of schooling can be enforced . . .

"Compared with the Canal Boat children, these gypsies appeared to be much more alert and intelligent. Their social environment is very different from that of the Canal Boat Children; they mix freely with the other gypsy children and have some intercourse with the outside world in their selling and buying."

The application of the intelligence-tests to eighty-two gypsy children disclosed an average intelligence-quotient of 74.9, which is between the average of the physically-defective children and the average of the canal-boat children. Like the latter, the gypsies revealed a decreasing quotient from the younger to the older age-groups. This held within the several families as in the case of the canal-boat children, and the fact is advanced by Gordon "to confirm the conclusions formed in the previous investigations." Of prime importance are his general comments[1] on all three studies:

"The far more important question suggested by these results is whether there is any mental development apart from mental effort and such mental exercises as are generally associated with school life. The answer to this question probably depends upon the social environment of the children. In a good social environment a child's development would not be so dependent on the effects of schooling as in a poor social environment in which there was little or no intellectual life. Further, it would seem that too long delay in a beginning of school life has had a very injurious effect on such children as have been tested, that, in fact, it is almost impossible to make up for such delay. As to whether these

[1] Gordon, *op. cit.*, pp. 59f.

children might do better in 'performance' and other tests is a matter of much interest. It is my impression that the gypsies might do better, but not the Canal Boat children. An opinion on such a matter without further evidence is, however, of little value."

Gordon concluded this series of interesting investigations with a study that involved the application of the same tests to two groups of children in "backward classes" of the regular elementary schools. With these children he found a slight negative correlation between school-attendance and mental age, and a much lower positive correlation between school-attendance and scholastic attainments than in the case of the other groups tested. He suggests[1] that, with children whose retardation is due to *lack of schooling* there has been a "natural development" due to whatever school stimulus they may have had, which is shown by their ability to "deal with the mental tests of a somewhat similar age to that indicated by the educational age." In other words, "they have developed in various directions by the mental exercises involved in schooling." With children whose backwardness is due to *natural causes*, on the other hand, "this all-round development does not seem to take place." While such children may be taught by continual practice to carry out certain mechanical operations, "they cannot tackle equally well (*i.e.*, age for age) anything that they had not been taught." Gordon raises the question whether, even with these backward children, carefully graded exercises in problems requiring thought might not have a beneficial effect in stimulating mental growth. His monograph closes[2] with a significant paragraph:

"In conclusion, it is quite evident that, although the mental tests do undoubtedly test some kind of ability or abilities, such

[1] Gordon, *op. cit.*, p. 74.

[2] Gordon, *op. cit.*, p. 87.

abilities are not developed without schooling or its equivalent, and as a consequence, the tests do not evaluate them apart from schooling, except *perhaps* in the case of children under six or seven years of age."

These investigations by Burt, Willard, White, Miss Graves, Mrs. Woolley, and Gordon not only confirm in a striking fashion the position taken by the present writer in his paper[1] before the Society of College Teachers of Education in 1922; they are in themselves a far more sweeping indictment of the deterministic hypothesis than seemed at all justified at that time. Indeed, the distinction that the present writer made between "vertical" and "horizontal" growth seems now unnecessary as a support for his contentions. The distinction is still a valid one, but it seems that a sharp line cannot be drawn between the two types of growth. In other words it is now clear that *horizontal growth may bring about a significant access of vertical growth.* This is a far more encouraging finding than the present writer dared to hope for in 1922.

But this is not all. The determinists have built their superstructure upon the concept of "general intelligence." It is now demonstrated that general intelligence, as they have defined it is affected in a significant degree by specific training. *Quite obviously, this is nothing more nor less than the validation of "formal discipline"* (although not necessarily in the primitive and naïve sense of the term). Clearly, if general intelligence operates as the determinists say that it operates (namely as a factor conditioning the efficiency of specific learning-activities and an effective adaptation to new situations); and if general intelligence is influenced in a substantial measure by specific education (as the investigations now show indisputably to be the case); then the chapters on

[1] Ch. I, above.

formal discipline in most of the current textbooks of educational psychology are in sad need of revision.

How far this two-edged knife will ultimately cut into the vitals of contemporary educational theory it is difficult now to predict. The complete and wholesale denial of disciplinary functions which characterizes present-day theory has been almost as prejudiced and intolerant as was the naïve belief which it set out to shatter. The results of the experiments have never justified so sweeping a condemnation; the facts of everyday life speak most convincingly against it; and now we have the concept of general intelligence, first launched for quite another purpose, returning like a boomerang to deal a crushing blow to one of the dearest delusions of contemporary psychology.

How deeply the knife *may* cut is suggested by two interesting and penetrating studies. Clark,[1] in comparing the various components that go to make up the standard intelligence-tests, has found that the test-elements showing the highest correlations with the total scores are those which measure one's "range of information." Here we have "horizontal" growth turned into "vertical" growth with a vengeance. We had become so accustomed to the constant flow of talk discrediting knowledge, scholarship, "book learning," and particularly "mere" information that we had about reached the conclusion that to teach a child anything in the way of definite knowledge or information was little less than a crime.[2]

[1] Clark, John R.: *The Relation of Speed, Range, and Level to Scores on Intelligence Tests.* (MS. on file in the library of Teachers College, Columbia University.)

[2] At the Cleveland meeting of the National Society for the Study of Education in 1923, the present writer suggested that, if this official discrediting of knowledge by "educators" went much

The first definite identification of formal discipline with the contribution of education to intelligence as measured by the tests came in 1924, when Thorndike published an article entitled "Mental Discipline in High School Studies."[1] The investigation reported in this article was undertaken to determine whether different high-school studies had different effects upon pupils of the same initial ability or intelligence. Two examinations were given to 8564 high-school pupils. These examinations were "alternative forms of a composite of tests of 'general intelligence.'" One form of the tests was given in May 1922, and the other in May, 1923. A record was made of the high-school subjects that the pupils pursued in the interim, and the amount of gain or loss during the year in the intelligence score was correlated with the subjects of study pursued. The measurements of "general intelligence" were made on a scale of 340 points. The average gain for the year was 23 points on this scale. Of this gain, however, 11.9 points "are attributable to the special practice with the examination, leaving 11.1 points as due to the growth and training during the year."[2]

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further, the only way to get facts into the child's mind would be through "bootleg channels." The allusion was, of course, sharply resented; and yet, since expert opinion in our field has succeeded in gathering about it a certain halo of sanctity, I do not think that the figure is overdrawn. I have known classroom teachers to apologize when "caught" doing some real teaching. They have said in effect that they were well aware that they ought not to do it—that they should get results by indirection, development, projects, or what not—but that they felt that their pupils needed on this occasion a little direct instruction. I confess that I have never "reported" these self-confessed sinners to the authorities.

[1] Thorndike, E. L.: "Mental Discipline in High School Studies," *Journal of Educational Psychology*, Vol. XV, No. 1, Jan., 1925, pp. 1–22.

[2] *Op. cit.*, p. 11.

In comparing the different school studies as to their relative influence upon the gain made in the scores, the measure employed was the frequency with which each subject appeared in the programs of the pupils making different amounts of gain. It was found—[1]

"that there is a positive relationship between the presence of French or Chemistry in a pupil's program and gain in the test, and a negative relation between the presence of cooking or sewing in a pupil's program and gain in a test. In the case of shop, Spanish, or drawing, there is zero relation approximately, these studies being as frequent in the programs of pupils who gain little as in those who gain much."

The school studies apparently influenced the growth of "general intelligence" in the following order:—French, chemistry, trigonometry, physics, general science, Latin, bookkeeping, physical training, arithmetic, geometry, algebra, history, music, Spanish, English, drawing, business, civics, biology, dramatic art, stenography, economics, cooking and sewing. Although Thorndike's article attempts no interpretation of the findings, two points seem tolerably clear from his published data: (1) Different subjects of study influence the growth of "general intelligence" in different degrees; and (2) these differences in degree are in fair agreement with what might have been predicted from the application of an enlightened doctrine of formal discipline. While the differences may not be wide, it should be remembered that they are the results of but one year's training, and that *four years of school training may well be inferred (provisionally at least) to compound these differences.*

II

The sweeping denial of disciplinary functions is not the only conclusion of contemporary educational psychol-

[1] *Op. cit.*, p. 18.

ogy that has been brought into serious question by recent investigations. Of even greater significance to the theory of democracy is the accumulation of evidence against the belief that education increases individual differences, and distinctly in favor of the conception that education is (in some measure at least) a "leveling-up" agency.

A priori, the easy inference from the hypothesis of "general intelligence" is that equal training applied to persons of varying degrees of initial ability will widen the differences in ability that existed at the outset. In other words, if one has by nature a certain *quantum* of ability to learn, any addition gained through exercise or training would seem to be directly proportional to the initial amount. Under the same conditions of training, then, the quick learner, it may be inferred, will progress so much more rapidly than the slower learner that the gap between them should increase rather than diminish. Under such conditions, indeed, the logical inference is that training would augment initial differences in a geometrical ratio,—that the final result would be even more than a *sum* of heredity *plus* environment, it would be a *product* of heredity *times* environment.

This plausible inference has seemed, in general, to be in harmony with the observed facts. When individuals of varying ability have been subjected to the same training under experimental conditions, it frequently has been found that the differences at the end of the training were apparently wider than at the beginning. In summarizing several experiments of this type, Thorndike[1] reached a conclusion that has had a profound influence upon educational theory and practice:

[1] Thorndike, E. L.: *Educational Psychology*, New York, 1914, Vol. III, p. 305.

"Equalizing practice *seems to increase differences.* The superior man seems to have got his present superiority by his own nature rather than by superior advantages of the past, since during a period of equal advantages for all he increases his own lead."

Essentially the same position is taken by other authorities in the field. For example, Henmon:[1]

"All experimental studies point in the direction that practice does not equalize abilities; in fact, equal practice tends to decrease them. The more gifted individuals profit more, both relatively and absolutely, than the less gifted."

The experimental evidence, however, is not entirely unequivocal in respect of this important issue. Some of the learning curves that have been reported show a clear tendency toward a decreasing rather than an increasing of the initial differences, and the facts of everyday life also add their testimony against the universality of the conclusion that equal training tends even more widely to separate individuals of varying capacities. These facts led the present writer in 1922 to make the statement quoted in Chapter II:

"One person, in commenting on my paper,[2] asked this question, 'How can you believe that, among all biological traits, mentality alone is not subject to biological variation?' Of course I hold no such belief; whatever the biological bases of mentality may be, they are certainly subject to the laws of variation; but, in so far as I am informed, mentality among all of the variable biological traits, seems to be the only one that *distills its own corrective.*"

In January, 1923, in a joint discussion with Professor Thorndike before the faculty of Teachers College, this point of view was again set forth:

[1] V. A. C. Henmon, quoted by H. B. Reed, *Journal of Experimental Psychology*, Vol. VII, No. 3, June, 1924, p. 187.

[2] Published as Chapter I of this volume.

"Assuming that training sharpens inherited abilities, the obvious inference is that the same training given to persons of widely differing native abilities will still further separate them. And yet if we take a group of people who differ widely in inherited ability and have had the same training, we know that there are resemblances among them that mark them off distinctly from a group of people, also varying in native endowment, who have not had a common education. Here education has certainly created resemblances—and, I hasten to add, resemblances of a very important sort, for they constitute the prime conditions of social living, of a common understanding, and of collective activity of an effective type.

"What constitutes the essential resemblances among the members of this educated group? In the first place, while it is possible that their common education woking on their varying inheritances has resulted in wider differences among them in *certain* of their abilities than existed at the outset, they have in other ways been brought pretty close together. The reason may be this: The typical practice-curve picturing the growth that comes through training shows that growth is generally rapid at first and then gradually diminishes until the curve flattens out into a permanent plateau. Differences in native capacity clearly determine the time and effort that are essential to reach the maximum, but when the quick learner is approaching his maximum his speed is retarded, and the slow learner is catching up with him. While the slow learner may never reach the higher levels, it is clear that, in the case of certain abilities, prolonged common training will have the effect of actually diminishing the differences which existed at the outset, and at the same time be profitable for all concerned. In other cases, of course, an effective working maximum may not mean the actual maximum that each individual can reach, and here the training of the quick learners can profitably stop while the slower learners are brought up as close to the working maximum as they can reach."

The writer then called attention to Chambers's study[1] of observational learning and accuracy of report as

[1] Chambers, O. R.: "Relation of Intelligence and School Training to Observational Learning and Accuracy of Report." *Bulletin*, Extension Division, Indiana University, Vol. VII, No. 12, Aug., 1922.

substantiating in a measure his contention. Without going into the details of this study, it is sufficient here to say that systematic training in "observation" and "accuracy of report" led to marked improvement in these two abilities. When the results of the experiment were distributed on the basis of the initial intelligence of the learners, the following conditions were found:

". . . although the upper half of the class made goodly gains under the influence of our uniform scheme of training, still at the end of the training period in each case the lower half was much more nearly on a par with the upper half than at the beginning of the training, indicating that they had improved more rapidly than the better mentally endowed halves of our respective training groups.

"It is, then, the more poorly endowed who seem to reap the greatest benefit from such training, which suggests that the better endowed had already worked out for themselves a method of improving their powers of observation, and have come to realize practically . . . the elements that make for improvement, while those possessing less native endowment have not been able to do this for themselves. But given the necessary help by special training and the necessary incentives . . . they show rapid improvement. The indication is that they would soon overtake the more fortunate half of our total group. Regardless, however, of what the cause may be, the fact remains that training in observation may be given with great success to that section of our school population which stands most in need of aid in this fundamental type of learning."[1]

The more recent studies not only confirm the position that the present writer took in 1922 and 1923, but in a quite unexpected fashion add strength to his contentions. Two investigators, apparently working quite independently of one another, have discovered that much of the experimental evidence used to support the theory that equal training increased individual differences is open to quite the opposite interpretation.

[1] Chambers, *op. cit.*, p. 131.

H. B. Reed,[1] reporting in 1924, took the data cited by Thorndike, Henmon, Starch, and others in substantiation of this theory and showed that merely changing the method of measuring improvement reversed the evidence of most of the experiments. Consider, for example, a simple case: At the beginning of a learning-experiment, a quick learner can solve (say) five problems an hour involving certain arithmetical operations new to him; a slow learner under the same conditions can solve (say) two problems; the difference in ititial efficiency between the two learners, then, is three problems an hour. At the end of the period of training, assume that the quick learner can solve twenty-five problems an hour, and the slow learner fifteen; the difference in terminal efficiency between the two learners is ten problems. Measured in this way, equal training seems clearly to have *increased* individual differences. But change the method of comparison: at the outset, the slow learner had only two-fifths or forty per cent of the quick learner's efficiency; at the end of the period of equal training, he has fifteen twenty-fifths or sixty per cent of quick learner's efficiency. Is it not equally clear that the difference between the two has been *decreased* by the training?

Reed does not use this specific illustration, but he does give a number of analogous cases taken from the published records of learning experiments which have been repeatedly cited to support the deterministic hypothesis that equal training increases individual differences. The absolute differences are frequently increased, but the relative differences are decreased almost as frequently. The exceptions, of course, are those cases in which the quick learner maintains a rate of progress that is always proportionately equal to or greater than his initial lead.

[1] Reed H. B.: *Journal of Experimental Psychology*, Vol. VII, No. 3, June, 1924, pp. 186ff.

These cases, however, are very rare in the published records.

Reed concluded from his analysis of the experimental literature that various methods should be used for measuring the differences between the slow learners' progress and that of the quick learner. He devised three tests involving learning exercises of different degrees of difficulty which he applied to relatively large groups of college students. The two measures of difference that he believes most trustworthy are (1) "the ratio of the high scores to the low scores at the beginning and at the end of practice," and (2) "correlations between initial performance and per cent of improvement." Measured by these criteria, his results showed a general decrease of individual differences with training. He presents the following interpretations:[1]

"In the simpler skills, at any rate those that are taught in our elementary schools and which are important for everyone in making a living and in discharging the duties of citizenship in a democracy, the evidence indicates clearly that equal training makes individuals more equal in spite of their differences in native capacity. Many and probably most of the inequalities of life could be reduced by giving everyone equal opportunities in education. But when it comes to difficult problems, requiring great mental ability . . . it is likely that here the achievements are more nearly proportional to native ability."

Miss Kincaid[2] in January, 1925, reported a similar analysis of the experimental literature embodying results from some twenty-six separate investigations. On the basis of five possible methods of making comparisons between quick and slow learners, "facts indicating a general tendency to increase of differences are found under only one form of comparison," while "facts indi-

[1] Reed, *op. cit.*, p. 199.

[2] Kincaid, M.: *Psychological Review*, Jan., 1925, p. 47.

cating a prevailing tendency to decrease" are found under four forms of comparison. Her conclusions are these:

"The general results of our analysis must be as follows. In the investigations of practice in various functions which we have attempted to study with a view of determining whether original nature or some environmental factor is causing the differences in achievement which we find among individuals, it has been found that in the main there is a tendency for the differences to decrease as the result of a period of equal amounts of training for the group.

"In a minority of the experiments there has been fair evidence of a slight tendency for the superior individuals to increase their lead with the addition of equal units of practice. In just one experiment [out of twenty-six] the evidence has pointed strongly to such a tendency."

The statement made by the present writer to the effect that "mentality distills its own corrective" for germinal variations is thus pretty clearly substantiated even when one considers only variations in those mental traits that can be definitely classed as "abilities." Beyond these, however, there are other mental traits which defy classification under this strictly behavioristic rubric, but which are none the less real and none the less significant. Indeed, it is not too much to say that both *equalities and inequalities in mental abilities* are of far less significance to the theory and practice of democracy than are *resemblances and differences in mental content*, that is to say, in *ideas*, *ideals*, and *standards*. The dominant school of contemporary psychology refuses to recognize these terms as connoting mental traits, and consequently it is futile to quarrel with the psychologist for confining his discussions of individual differences to abilities—especially since the experiments so rigorously limited to abilities completely confirm our hypothesis. Neither the theory of education nor the theory of democracy, however, can well reject the terms "ideas," "ideals," "standards,"—terms which at least imply that mentality has something to do with conscious experience.

CHAPTER VIII

SOME HYPOTHESES AND PROVISIONAL CONCLUSIONS

An outstanding lesson to be gained from the evidence and the arguments set forth in the preceding pages is the grave danger of regarding as anything more than provisional the inferences drawn from observed facts or apparent facts in a complicated field of study. This danger is especially marked in the study of educational and social problems, for here not only are the complicating factors extremely hard to isolate, but almost no student can attack such problems without a bias. It is most important, then, both to employ extreme caution in the interpretation of findings and frankly to admit the definite bias or mental set with which one has approached the interpretation. Unfortunately the construction of working programs cannot always or often await the final verdict of science regarding the validity either of one's data or of one's method. But there is a safeguard that one may always employ: if one cannot always be right, one can at least make a desperate effort to be both clear and frank.

The present writer does not for a moment pretend that he is unprejudiced with regard to the issues discussed in these papers. He has a very definite "axe to grind,"—a very real and intense desire to establish an hypothesis. In this respect, he differs from his good friends, the determinists, chiefly through recognizing and acknowledging his prejudice. Nor does he assume that the "facts

are all in" even now with reference to the contribution that education makes to intelligence. It is not at all impossible that future investigations may shift the burden of evidence to the other side, although it is highly improbable, in the light of what is now so well established, that the extreme wing of the hereditarian camp can ever again lay a valid claim to the territory that it was enabled briefly to occupy through the fortuitous incidence of social reaction with the spectacular but specious implications of the Army tests.

It is, therefore, with a degree of confidence clearly sanctioned by the support which the recent investigations have brought to his contentions, and yet a confidence tempered by caution, that the writer proceeds to a provisional statement of the position that should be taken, in his judgment, by educational theory and practice regarding the problems and issues under discussion. For the sake of brevity and clearness, these provisional conclusions will be set forth in the following theses:

1. The term "general intelligence" should be provisionally accepted as connoting the most important function of mind,—namely, the ability to control behavior in the light of experience.

2. More specifically, variations in general intelligence may be taken to mean variations in the ability of individuals: (1) to adapt themselves through a process of judgment to new situations; (2) to draw or "abstract" general inferences from specific experiences; (3) to apply general principles to specific situations; (4) to "learn" readily. (These abilities, quite obviously, mean essentially the same thing.)

3. General intelligence clearly depends in part upon physiological functions; and inasmuch as physiological processes are functions of anatomical structures, the inference that general intelligence will be *in part* deter-

mined by original endowment or physical heredity is *a priori* incontestable. This inference is also clearly substantiated by the observed facts.

4. On the other hand, and just as clearly, general intelligence is determined *in part* by environmental opportunities, especially by environmental pressures, and most profoundly in all probability by those types of environmental pressure that are represented by *systematic schooling* during the period of physiological growth or maturation.

5. The contribution of systematic schooling to general intelligence is probably equal to the combined contributions of native endowment and the informal pressures of the average social environment.

6. So powerful is the influence of systematic schooling that it appears in many ways to counteract some of the differences due to original nature, to such an extent at least that one is justified in referring to general intelligence as a human trait which "distills its own corrective" for organic variability, and in assuming that education may be made, in a very real sense, a "leveling-up" process.

7. General intelligence is not the only factor conditioning achievement, economic efficiency, leadership, and character; but it is beyond doubt one of the important factors, and it is the only factor that seems now to be under a fair degree of social control.

8. The importance of systematic schooling in the determination of general intelligence probably varies with the kinds of materials (experiences, disciplines, subjects of study) which the schooling represents. In general, the school-pressures that stimulate the learner to *systematic and sustained mental effort toward the mastery of relatively abstract processes and toward the formation of*

ever-broadening concepts in ever-widening fields of knowledge seem to yield the largest growth.

9. It seems that the importance of *early* training, discipline, and systematic instruction can scarcely be overemphasized. "Educational opportunity" means with especial force care and culture during early childhood and youth. This inference is strongly suggested by Visscher's findings regarding the greatly superior chances that children of clergymen have over other children to acquire the qualities of heart and mind that lead to achievement and distinction; it gains added weight from the investigations reported by Mrs. Woolley (see Chapter VII).

10. Climate apparently exerts a powerful influence upon the possibilities of developing high levels of general intelligence through universal education, and from the data now available seems to be, in general, a much more important factor than race. It is reasonable to conclude provisionally, however, that neither climate nor race imposes an insuperable obstacle to a fairly complete integration of all peoples upon a cultural basis

11. There is a close and probably a causal relationship between the level of intelligence attained through universal education by the people of a nation and the relative freedom of the nation from "war, revolution, demagogy, despotism, degeneration." By far the most hopeful approach to the reign of universal peace is the encouragement of universal education among all peoples.

12. It is probable, however, that the influence of mass-education on "moral" controls of conduct depends upon the *quality* as well as upon the *quantity* or *extent* of the education provided. Mass-education may easily be made to intensify chauvinism and thus fail to decrease the peril from war in the measure that might otherwise be

possible. On the other hand, mass-education may just as easily be made to intensify individualism and thus encourage gratification and indulgence and discourage renunciation and sacrifice. The one extreme may be a menace to the world's peace; the other may exert an unfortunate influence upon the moral fiber of a people. While the one extreme was reflected by the spirit and ideals that governed elementary education in Germany before the War, it is also possible that the other extreme characterizes far too strongly the dominant spirit and ideals of American education today.

13. The "disciplinary" function of systematic education is probably far more significant than is usually granted by the current interpretations of the experiments in "transfer of training." While it would be most unfortunate to go back to the naïve conception of formal discipline that prevailed in the past, it would be the part of wisdom to go forward to a new conception which would aim to correct the unquestionable weakness, not to say flabbiness, of the position taken on this important issue by contemporary educational theory.

14. The vital importance of discipline to democracy is likely to be discounted and obscured by irrelevant appeals to "freedom,"—and its implications of ease and comfort. Unless democracy can find a place in its theory and practice for discipline, duty, and sacrifice, it will be so seriously handicapped that its ultimate success will be a matter of the gravest question. Whether we like it or not, we cannot deny that, in the history of the race, anything that even remotely resembles freedom (freedom not only from personal thralldom, but freedom as well from want, dread, fear, fraud, and superstition) has been *a* conquest, not a gift. In a very real sense, education must reflect in each generation this element of struggle and conquest.

APPENDIX

A

Correlations, Concomitants, and Causes

In any attempt to apply mass-measures to the results of education one is quickly confronted with the problem of distinguishing between relationships that are only concomitant and relationships that are truly causal. As has been pointed out repeatedly in the preceding pages, the fact that the American states vary in their present-day levels of intelligence and efficiency directly as they have varied in their past provisions for mass-education is not in itself proof of a causal relationship between good schools on the one hand and intelligence and efficiency on the other hand. At least four hypotheses may be advanced to explain the observed facts: (1) the direct relationship may be purely accidental; (2) good schools may be the cause of intelligence and efficiency; (3) intelligence and efficiency may be the cause of good schools; (4) good schools, intelligence, and efficiency may all be the results of other causal factors which do not appear in the relationships observed.

The difficulty of drawing definite conclusions from comparisons of this type has quite properly made the student of education extremely reluctant to employ mass-measures in an effort to demonstrate the positive benefits of good schools. He has consequently limited his investigations very largely to individuals and to relatively small groups. This has been a handicap, for it is obvious that important changes, wrought by education, might be readily discernible in the mass even though they could not be detected in the individual or in small groups of individuals. The limitation has also operated to the disadvantage of education in another way. The determinist has not been slow to capitalize the difficulty of tracing social effects back to educational causes by claiming for hereditary factors all of the causal credit. Just as long as the positive influence of education remains unconfirmed

by unequivocal evidence just so long will the hereditarian doctrines have the upper hand.

It is the contention of the writer that the studies reported in the present volume have overcome many if not most of the difficulties involved in distinguishing causes from concomitants in this complicated field of investigation. He maintains that the evidence set forth clearly substantiates the claim of education to a positive rôle in determining the fundamental traits of social groups. He does not contend that education works independently of other factors. Such factors, indeed, must always be counted upon to condition and complicate the efficacy of educative forces. Of these, physical heredity (whether expressed in terms of distinctive racial traits or in terms of the superior or inferior mentality of selected groups within recognized races) must be granted some weight; but our studies suggest strongly that geographical factors, and especially *climate*, will ultimately be found to overtop racial heredity in social significance. Formal and systematic education on a universal basis, however, apparently transcends both racial heredity and climate as a fundamental factor, although its operation and its effectiveness are clearly limited by both.

The arguments supporting our principal contentions are based in large part on the evidence set forth in Chapter IV and Chapter V. For convenience, they will be assembled and summarized at this point:

1. Because the American states have varied widely in the facilities that they have provided for mass-education and because they vary widely to-day in the levels of intelligence, leadership, morality, and economic efficiency that their several populations reflect, they form an unusually promising field for studying the relationships between the schooling provided in past decades and the present-day levels represented by the dominant adult generations. Fortunately for purposes of comparison, there are available: (*a*) fairly reliable measures of school efficiency for ten-year periods from 1880 to 1920; and (*b*) even more reliable measures of present-day levels of intelligence, efficiency, and leadership. For the moral levels of present state populations, equally trustworthy data are unfortunately lacking, but certain measures are available even here.

2. The resemblances between past provisions for mass-education and present-day levels of intelligence, efficiency, and leadership,

while fairly close when all of the states are considered, are notably and consistently increased when only those states with relatively stable populations enter into the comparisons. Unless a causal factor were involved, a reduction in the number of cases considered would be likely to reduce the degree of resemblance instead of increasing it.

3. When all of the states are considered, the commonwealths which show the widest discrepancies between their past provisions for education and their present-day levels of intelligence and efficiency are found to be the states that have grown rapidly during recent decades through immigration either from other states or from foreign countries. When this immigration is traced to its sources (by reference to the Census reports), it is found that the new population in these discrepant states has come very largely from other states (or from foreign countries) in which the school facilities a generation ago were quite consistent with the present levels of intelligence and efficiency of the states in question.

4. The close resemblance between past provisions for mass-education and present-day levels of intelligence and efficiency holds for the negro population as well as for the white population. In view of the fact that the negro population was not in any significant measure responsible for the schools of a generation ago, an effort to explain these resemblances on the basis of heredity would seem to be ruled out.

5. On all of the present-day measures considered in Chapter IV, the closest resemblances with school facilities fall *without a single exception* in the decades when the generations most likely to be represented by the measures were of school age. That this is a purely accidental result is rendered most unlikely by the thoroughgoing consistency of the evidence; nor can either the hereditarian or the geographical hypothesis be advanced in explanation, for either of these would be much better suited if the closest resemblances fell in the most recent decades. Clearly nothing less than a direct causal connection between past provisions for education and the traits reflected in the present-day measures can account for this finding.

6. The average correlation of the several present-day measures with past provisions for schooling is significantly higher than the average correlation of the several present-day measures with one another. In only one case does the comparison of a pair of present-day measures with one another show a closer resemblance

than the comparison of one of the measures with past provisions for schooling—and even here the superiority is slight.

7. When each of four different present-day measures is in turn held constant by applying the technique of partial correlations, the residual resemblances of the others to schooling are, with one exception, positive, and in general very high. The average of the residual correlations is overwhelmingly in favor of the hypothesis that ascribes to educational opportunity a causal influence in determining present-day levels of intelligence, leadership, and efficiency.

8. The results of our state comparisons closely parallel the results of Burt's investigation of the contribution of schooling to intelligence. The hypothesis that ascribes a positive influence to systematic education in the development of "general intelligence" is also confirmed in a striking fashion by the long list of recent studies the results of which are set forth in Chapter VII.

B

A Supplementary Comparison of 34 States

The principal comparisons described in Chapter IV considered 26 states in each of which 55 per cent or more of population was native to the state according to the Census of 1910. By making this limitation we were able to eliminate in part the factor of the migrant population. All of our measures could be applied to these states, but there are other states coming within the 55-per cent standard for which the Army Alpha data were scanty.

In order to determine what effect a wider selection would have upon the comparisons, data were later assembled for the 34 states in which at least 50 per cent of the population was native to the state according to the Census of 1920. Adding the eight states included three states with relatively large proportions of non-native population (Connecticut, Minnesota, and New Jersey), together with the states omitted from the first list on account of the small proportion of white Alpha scores reported. (These states were Delaware, Florida, New Mexico, and West Virginia.)

These 34 states were treated on the basis of: (*a*) the median Alpha scores of both the white and the colored troops; (*b*) Reeder's ratings based on the *per-capita* circulation of 10 magazines; (*c*) the leadership ratings; and (*d*) Knauth's *per-capita* income ratings.

The correlations with school opportunities for the decades 1880–1920 were found to be as follows:

Table 9.—Comparison of Present-day Measures with Past School Ratings for Thirty-four States

	Median Alpha scores	*Per-cap.* circulation 10 magazines	Leadership ratings	*Per-cap.* income (Knauth)
Correlations with:				
Schools, 1880	0.75	0.86	0.89	0.78
Schools, 1890	0.64	0.86	0.86	0.83
Schools, 1900	0.81	0.92	0.87	0.85
Schools, 1910	0.79	0.93	0.87	0.82
Schools, 1920	0.83	0.83	0.77	0.66

It will be noted that, although the number of cases has been increased, the correlations in every case are lower than for the 26 states treated in Chapter IV. The highest correlations, however, tend to fall in about the same decades as in the latter treatment, the only notable exception being in the case of the Alpha scores. This is undoubtedly due to the relatively inaccuracy of this measure when we include the states from which the very small proportions of white scores were reported.

C

State Ratings on Ten Present-day Measures of Intelligence, Leadership, Morality, and Economic Efficiency

In the course of the studies reported in this volume, the states were compared on the basis of a number of measures. Ten of these comparisons are printed as Tables 10 to 19 inclusive. Table 20 combines the standard scores on four measures which are assumed to reflect the state levels of intelligence and leadership; Table 21 combines the standard scores on four measures that are assumed to reflect the levels of basic morality and respect for fundamental law; and Table 22 combines the standard scores of two measures that are assumed to reflect the general level of economic efficiency. A composite ranking based upon all 10 measures is presented in Table 23.

The value of the final composite ranking (Table 23) depends, of course, upon the validity of the component measures and upon

the justice of ascribing the same value to each (assuming the numerous computations involved in reducing the measures to standard scores and in combining the scores to be relatively free from errors!). Two of the ten measures, it will be noted, could not be applied to all of the forty-eight states. No Alpha data for Arizona appear in the Army report, and the homicide-rates are available for only the thirty-four states constituting the registration-area. In combining the standard scores for Tables 20–22 inclusive, the average of the remaining scores for each of the missing states in each of the two rubrics affected (intelligence and morality) was substituted. If any error is involved in this process it is probably not large enough to do a serious injustice to any of the states except possibly those with very small populations.

There is a suggestion that this composite ranking is fairly reliable in the high correlation (for the twenty-six stable states) with the median school ratings for 1880–1910 inclusive, and in the fact that the closest resemblance (0.92) with school ratings falls in 1890, or just one generation back of the period reflected by the several measures.

Two points deserve especial emphasis if we assume that this composite ranking is fairly reliable. In the first place, the fact that the New England states head the list adds confirmatory evidence to the comparisons set forth in Chapters IV and V, and to the interpretation of these comparisons in terms of educational opportunity. In the second place, the influence of the geographical (or climatic) factor is clearly evident.

TABLE 10.—FORTY-SEVEN[1] STATES RANKED ACCORDING TO THE MEDIAN SCORES MADE BY THEIR DRAFT-CONTINGENTS (BOTH WHITE AND COLORED) ON THE ALPHA TESTS, 1918

Rank	State	Median score	Deviation from the mean	Standard score
1	Oregon	79.88	23.22	1.51
2	Washington	79.19	22.63	1.47
3	California	78.06	21.50	1.39
4	Wyoming	77.84	21.28	1.38
5	Connecticut	73.51	16.95	1.10
6	Idaho	73.41	16.85	1.09
7	Utah	72.16	15.60	1.01
8	Massachusetts	71.52	14.96	0.97
9	Colorado	69.58	13.02	0.84
10	Pennsylvania	68.71	12.15	0.81
11	Montana	68.40	11.84	0.77
12	Vermont	67.44	10.88	0.71
13	Maine	66.89	10.33	0.67
14	Nebraska	66.10	9.54	0.62
15	Ohio	65.98	9.42	0.61
16	Iowa	64.44	7.88	0.511
17	Nevada	64.38	7.82	0.507
18	Minnesota	64.20	7.64	0.50
19	Michigan	63.29	6.73	0.44
20	Rhode Island	62.77	6.21	0.40
21	Illinois	62.61	6.05	0.39
22	New Hampshire	61.82	5.26	0.34
23	New York	60.86	4.30	0.28
24	Kansas	60.68	4.12	0.27
25	New Mexico	60.00	3.44	0.22
26	South Dakota	58.20	1.64	0.11
27	North Dakota	57.03	0.47	0.03
28	Wisconsin	56.48	− 0.08	−0.01
29	Missouri	56.33	− 0.23	−0.015
30	Virginia	55.43	− 1.13	−0.07
31	Indiana	55.27	− 1.29	−0.08
32	Maryland	52.01	− 4.55	−0.29
33	West Virginia	50.65	− 5.91	−0.38
34	Oklahoma	50.05	− 6.51	−0.42
35	Delaware	50.00	− 6.56	−0.43
36	New Jersey	46.36	−10.20	−0.66
37	Texas	43.13	−13.43	−0.87
38	Tennessee	38.78	−17.78	−1.15
39	Alabama	38.73	−17.83	−1.16
40	Kentucky	38.04	−18.52	−1.20
41	North Carolina	35.69	−20.87	−1.35
42	Arkansas	35.26	−21.30	−1.38
43	South Carolina	33.92	−22.64	−1.467
44	Louisiana	33.91	−22.65	−1.468
45	Georgia	33.83	−22.73	−1.473
46	Mississippi	25.04	−31.52	−2.04
47	Florida	10.66	−45.90	−2.97
	Mean	56.564		
	Standard deviation	15.430		

[1] NOTE: The state omitted is Arizona. No data are given in the Army report for this state.

TABLE 11.—FORTY-EIGHT STATES RANKED ACCORDING TO THE *Per-capita* CIRCULATION OF TEN WIDELY-READ MAGAZINES (REEDER'S RATINGS)

Rank	State	Per cent circulation is of population	Deviation from the mean	Standard score
1	California	25.83	12.32	2.31
2	Oregon	24.99	11.48	2.15
3	Washington	24.10	10.59	1.99
4	Nevada	21.25	7.74	1.45
5	Wyoming	20.85	7.34	1.38
6	Montana	18.56	5.05	0.95
7	Colorado	17.97	4.46	0.84
8	Massachusetts	17.89	4.38	0.82
9	Connecticut	17.27	3.76	0.71
10	Idaho	17.09	3.58	0.67
11	Ohio	16.84	3.33	0.63
12	Vermont	16.52	3.01	0.565
13	New Hampshire	16.48	2.97	0.557
14	Michigan	16.43	2.92	0.55
15	Iowa	16.33	2.82	0.53
16	Maine	15.99	2.48	0.47
17	Nebraska	15.81	2.30	0.43
18	Minnesota	15.54	2.03	0.38
19	Arizona	15.28	1.77	0.33
20	Rhode Island	15.15	1.64	0.31
21	Indiana	14.77	1.26	0.24
22	New York	14.66	1.15	0.22
23	Illinois	14.43	0.92	0.17
24	South Dakota	13.92	0.41	0.08
25	Florida	13.61	0.10	0.0187
26	Kansas	13.60	0.09	0.0169
27	New Jersey	13.60−	0.09−	0.0169−
28	North Dakota	13.59	0.08	0.015
29	Pennsylvania	13.34	− 0.17	−0.03
30	Utah	13.08	− 0.43	−0.08
31	Wisconsin	13.04	− 0.47	−0.09
32	Missouri	12.47	− 1.04	−0.20
33	Delaware	12.32	− 1.19	−0.22
34	Maryland	10.67	− 2.84	−0.53
35	Oklahoma	10.05	− 3.46	−0.65
36	Texas	9.43	− 4.08	−0.766
37	New Mexico	9.42	− 4.09	−0.768
38	West Virginia	9.00	− 4.51	−0.85
39	Virginia	8.02	− 5.49	−1.03
40	Louisiana	6.49	− 7.02	−1.32
41	Kentucky	5.97	− 7.54	−1.415
42	Tennessee	5.94	− 7.57	−1.421
43	North Carolina	5.86	− 7.65	−1.44
44	Arkansas	5.69	− 7.82	−1.47
45	Mississippi	5.15	− 8.36	−1.569
46	Georgia	5.12	− 8.39	−1.574
47	South Carolina	4.77	− 8.74	−1.64
48	Alabama	4.36	− 9.15	−1.71
	Mean	13.511		
	Standard deviation	5.328		

TABLE 12.—FORTY-EIGHT STATES RANKED ACCORDING TO THE *Per-capita* CIRCULATION OF 13 "HIGHBROW" MAGAZINES (DATA COMPILED BY W. G. REEDER.) CIRCULATION FOR EACH STATE, 1922, PROPORTIONED TO POPULATION OF STATE, 1920

Rank	State	*Per-capita* circulation	Deviation from the mean	Standard score
1	California	2.34	1.32	2.59
2	Nevada	1.94	0.92	1.80
3	New Hampshire	1.84	0.82	1.61
4	Wyoming	1.78	0.76	1.49
5	Oregon	1.76	0.74	1.45
6	Vermont	1.67	0.65	1.27
7	Washington	1.63	0.61	1.20
8	Massachusetts	1.62	0.60	1.18
9	Connecticut	1.61	0.59	1.16
10	New York	1.53	0.51	1.00
11	Maine	1.37	0.35	0.69
12	New Jersey	1.31	0.29	0.57
13	Colorado	1.29	0.27	0.53
14	Montana	1.29−	0.27	0.53−
15	Rhode Island	1.23	0.21	0.41
16	Ohio	1.21	0.19	0.37
17	Utah	1.16	0.14	0.27
18	Michigan	1.15	0.13	0.25
19	Idaho	1.15−	0.13	0.25−
20	Arizona	1.11	0.09	0.18
21	Minnesota	1.08	0.06	0.12
22	Florida	1.07	0.05	0.10
23	Illinois	1.07−	0.05	0.10−
24	Pennsylvania	1.00	−0.02	−0.04
25	Nebraska	0.96	−0.06	−0.12
26	Maryland	0.93	−0.09	−0.18
27	Wisconsin	0.91	−0.11	−0.22
28	Iowa	0.90	−0.12	−0.24
29	Kansas	0.90−	−0.12	−0.24+
30	South Dakota	0.89	−0.13	−0.25
31	Missouri	0.87	−0.15	−0.29
32	Delaware	0.85	−0.17	−0.33
33	North Dakota	0.81	−0.21	−0.41
34	Indiana	0.80	−0.22	−0.43
35	New Mexico	0.67	−0.35	−0.69
36	West Virginia	0.64	−0.38	−0.75
37	Oklahoma	0.62	−0.40	−0.78
38	Virginia	0.58	−0.44	−0.86
39	Louisiana	0.51	−0.51	−1.00
40	Texas	0.50	−0.52	−1.02
41	North Carolina	0.42	−0.60	−1.18
42	Kentucky	0.39	−0.63	−1.24
43	Tennessee	0.33+	−0.69	−1.35−
44	South Carolina	0.33	−0.69	−1.35
45	Georgia	0.33−	−0.69	−1.35+
46	Alabama	0.29	−0.73	−1.43
47	Arkansas	0.27	−0.75	−1.47
48	Mississippi	0.23	−0.79	−1.55
	Mean	1.02		
	Standard deviation	0.51		

TABLE 13.—FORTY-SEVEN STATES RANKED AS BIRTH-STATES OF PERSONS LISTED IN *Who's Who in America* (VOLUME FOR 1924–25). (THE NUMBER IN EACH CASE IS PROPORTIONED TO THE AVERAGE POPULATION OF THE STATE IN THE CENSUS YEARS, 1850, 1860, 1870, AND 1880, WITH A DOUBLE VALUE GIVEN TO THE FIGURES FOR 1870)

Rank	State	Proportion to million of population	Deviation from the mean	Standard score
1	Massachusetts	1459	833	2.81
2	North Dakota	1218	592	2.00
3	Connecticut	1182	565	1.91
4	Rhode Island	1118	492	1.66
5	New Hampshire	989	363	1.23
6	Vermont	983	357	1.21
7	Utah	948	322	1.09
8	Washington	857	231	0.78
9	New York	838	212	0.72
10	Maine	835	209	0.71
11	South Dakota	796	170	0.57
12	Colorado	791	165	0.56
13	Minnesota	786	160	0.54
14	Delaware	783	157	0.53
15	Oregon	781	155	0.52
16	Ohio	723	97	0.33
17	Iowa	715	89	0.30
18	Wisconsin	713	87	0.29
19	California	705	79	0.27
20	New Jersey	692	66	0.22
21	Illinois	684	58	0.20
22	Nebraska	682	56	0.19
23	Montana	672	46	0.16
24	Michigan	664	38	0.13
25	Maryland	648	22	0.07
26	Pennsylvania	607	− 19	−0.06
27	Idaho	600	− 26	−0.09
28	Indiana	559	− 67	−0.23
29	Nevada	545	− 81	−0.27
30	Virginia	521	−105	−0.35
31	Kansas	474	−152	−0.51
32	Wyoming	461	−165	−0.56
33	Missouri	432	−194	−0.66
34	West Virginia	397	−229	−0.77
35	Kentucky	374	−252	−0.85
36	North Carolina	351	−275	−0.93−
37	Arizona	351−	−275	−0.93
38	South Carolina	333	−293	−0.99
39	Tennessee	316	−310	−1.05
40	Texas	287	−339	−1.14
41	Alabama	284	−342	−1.16
42	Florida	258	−368	−1.24
43	Georgia	257	−369	−1.25
44	Louisiana	228	−398	−1.34
45	Mississippi	223	−403	−1.36
46	Arkansas	215	−411	−1.39
47	New Mexico	87	−539	−1.82
	Mean	626		
	Standard deviation	296.10		

NOTE: The state omitted is Oklahoma, for which there are no population data for the census-years in question.

TABLE 14.—FORTY-EIGHT STATES RANKED *INVERSELY* AS BIRTHSTATES OF PRISONERS COMMITTED TO THE THREE FEDERAL PENITENTIARIES, 1ST 6 MONTHS OF 1923. (NUMBER IN EACH CASE PROPORTIONED TO THE POPULATION OF THE STATE IN 1890, EXCEPT FOR CASES STARRED, WHERE CENSUS OF 1900 WAS USED, AND DOUBLED-STARRED WHERE THE BASE WAS THE MEAN BETWEEN THE 1890 AND 1900 FIGURES)

Rank	State	Proportion to million population	Deviation from the mean	Standard score
1	Vermont	0.00	23.6	1.64
2	New Hampshire	2.6	21.0	1.46
3	Maine	4.5	19.1	1.33
4	Rhode Island	4.6	19.0	1.32
5	Delaware	5.9*	17.7	1.23
6	Idaho	6.1	17.5	1.21
7	New Jersey	7.8*	15.8	1.10
8	Wisconsin	7.9**	15.7	1.09
9	Massachusetts	9.8**	13.8	0.96
10	North Dakota	10.9	12.7	0.88
11	Pennsylvania	11.0	12.6	0.87
12	Nebraska	11.2	12.4	0.86
13	Connecticut	12.0	11.6	0.80
14	Minnesota	12.1	11.5	0.80−
15	Michigan	14.3	9.3	0.65
16	South Dakota	15.1	8.5	0.59
17	Iowa	16.8	6.8	0.47
18	New York	17.8	5.8	0.40
19	Colorado	20.3	3.3	0.23
20	Montana	20.5*	3.1	0.22
21	Maryland	21.1*	2.5	0.17
22	Wyoming	21.5	2.1	0.15
23	Illinois	22.7	0.9	0.06
24	Indiana	22.9	0.7	0.05
25	Washington	23.0**	0.6	0.04
26	South Carolina	23.45*	0.15	0.01
27	Kansas	23.48**	0.12	0.008
28	Arizona	24.3	− 0.7	−0.05
29	Oregon	25.1*	− 1.5	−0.10
30	Ohio	26.1	− 2.5	−0.17
31	Mississippi	27.9	− 4.3	−0.30
32	Kentucky	28.5	− 4.2	−0.34
33	Utah	28.8	− 5.2	−0.36
34	Louisiana	31.2	− 7.6	−0.53
35	North Carolina	31.5	− 7.9	−0.55
36	Alabama	31.7	− 8.1	−0.56
37	Virginia	32.6	− 9.0	−0.62
38	West Virginia	32.7	− 9.1	−0.63
39	Oklahoma	32.9	− 9.3	−0.65
40	Missouri	33.1*	− 9.5	−0.66
41	Florida	34.8**	−11.2	−0.78
42	Arkansas	36.0**	−12.4	−0.86
43	California	37.0	−13.4	−0.93
44	Texas	42.9**	−19.3	−1.34
45	Georgia	51.1*	−27.5	−1.91
46	Tennessee	53.1	−29.5	−2.05
47	New Mexico	57.1	−33.5	−2.32
48	Nevada	65.2**	−41.6	−2.89
	Mean	23.6		
	Sigma	14.41		

TABLE 15.—FORTY-EIGHT STATES RANKED *INVERSELY* ACCORDING TO THE NUMBER OF PERSONS NATIVE TO EACH STATE WHO WERE COMMITTED TO THE STATE PRISONS OF NEW YORK AND CALIFORNIA DURING THE TWO YEARS ENDING JUNE, 30, 1922, PROPORTIONED TO THE TOTAL NUMBER OF PERSONS NATIVE TO EACH STATE WHO WERE RESIDENTS OF NEW YORK AND CALIFORNIA, CENSUS OF 1920

Rank	State	Proportion to million of residents	Deviation from the mean	Standard score
1	New Hampshire	50	154.91	1.07
2	South Dakota	51	153.91	1.06
3	Iowa	69	135.91	0.94
4	North Dakota	70	134.91	0.93
5	Indiana	79	125.91	0.87
6	New Mexico	86	118.91	0.82
7	Vermont	87	117.91	0.81
8	Connecticut	88	116.91	0.81−
9	Oregon	92	112.91	0.78
10	Kansas	98	106.91	0.74
11	Rhode Island	99	105.91	0.73
12	Wisconsin	100	104.91	0.72
13	Maine	102	102.91	0.71
14	Colorado	110	94.91	0.66
15	Pennsylvania	112	92.91	0.64
16	Michigan	113	91.91	0.63
17	New Jersey	121	83.91	0.58
18	Ohio	123	81.91	0.57
19	Minnesota	126.2	78.71	0.54
20	Idaho	126.3	78.61	0.54−
21	Illinois	129	75.91	0.52
22	Nebraska	130	74.91	0.52−
23	Missouri	146	58.91	0.41
24	Nevada	149	55.91	0.39
25	Delaware	159	45.91	0.32
26	Massachusetts	161	43.91	0.30
27	Arkansas	162	42.91	0.30−
28	Utah	170	34.91	0.24
29	New York*	178	26.91	0.19
30	Montana	188	16.91	0.12
31	Mississippi	201	3.91	0.03
32	Maryland	208	− 3.09	−0.02
33	Washington	227	− 22.09	−0.15
34	Virginia	243.5	− 38.59	−0.27
35	Arizona	243.7	− 38.79	−0.27†
36	Kentucky	267	− 62.89	−0.43
37	California**	269	− 64.09	−0.44
38	Tennessee	270	− 65.09	−0.45
39	West Virginia	273	− 68.09	−0.47
40	Texas	308	−103.09	−0.71
41	Wyoming	342	−137.09	−0.95
42	North Carolina	387	−182.09	−1.26
43	Louisiana	393	−188.09	−1.30
44	Alabama	436	−231.09	−1.60
45	South Carolina	473	−268.09	−1.85
46	Georgia	573	−368.09	−2.54
47	Oklahoma	622	−417.09	−2.88
48	Florida	625	−420.09	−2.90
	Mean	204.91		
	Standard deviation	144.82		

*Rate based on number born in New York now living in California.
**Rate based on number born in California now living in New York.

TABLE 16.—THIRTY-FOUR "REGISTRATION" STATES RANKED ACCORDING TO THE INFREQUENCY OF HOMICIDES. AVERAGE RATES FOR 1919, 1920, 1921, PROPORTIONED TO THE MILLION OF POPULATION

(*Mortality Statistics*, 1921, pub. by Bureau of Census, 1924; p. 87)

Rank	State	Av. homicide-rate, '19, '20, '21	Deviation from the mean	Standard score
1	New Hampshire	17.0	56.77	1.18
2	Maine	17.3	56.47	1.17
3	Wisconsin	19.0	54.77	1.14
4	Vermont	20.0	53.77	1.12
5	Massachusetts	25.0	48.77	1.01
6	Rhode Island	27.3	46.77	0.97
7	Minnesota	27.6	46.17	0.96
8	Connecticut	39.0	34.77	0.72
9	Nebraska	45.0	28.77	0.60
10	New Jersey	46.0	27.77	0.58
11	New York	47.0	26.77	0.56
12	Michigan	48.0	25.77	0.54
13	Utah	49.0	24.77	0.52
14	Indiana	52.0	21.77	0.45
15	Oregon	53.0	20.77	0.43
16	Pennsylvania	59.0	14.77	0.31
17	Maryland	60.0	13.77	0.29
18	Washington	61.0	12.77	0.27
19	Kansas	62.3	11.47	0.24
20	Delaware	62.6	11.17	0.23
21	Ohio	73.0	0.77	0.02
22	Illinois	75.0	− 1.23	−0.03
23	Montana	77.0	− 3.23	−0.07
24	North Carolina	79.0	− 5.23	−0.11
25	Missouri	92.0	− 18.23	−0.38
26	California	97.0	− 23.23	−0.48
27	Colorado	105.0	− 31.23	−0.65
28	Kentucky	110.0	− 36.23	−0.75
29	Virginia	114.0	− 40.23	−0.84
30	Tennessee	152.0	− 78.23	−1.63
31	South Carolina	153.0	− 79.23	−1.65
32	Louisiana	166.0	− 92.23	−1.92
33	Mississippi	169.0	− 95.23	−1.98
34	Florida	209.0	−135.23	−2.81
	Mean	73.77		
	Standard deviation	48.07		

TABLE 17.—FORTY-EIGHT STATES RANKED ACCORDING TO THE PER CENT OF EACH STATE'S QUOTA OF DRAFTED SOLDIERS (2d MILLION OF DRAFT) FOUND INFECTED WITH VENEREAL DISEASES AT THE TIME OF ARRIVAL AT MOBILIZATION CAMPS

(Data from *Social Hygiene*, Vol. VII, No. 4, p. 420) (Inverse ranking)

Rank	State	Per cent infected	Deviation from the mean	Standard score
1	Vermont	1.3	3.95	1.09
2	South Dakota	1.6	3.65	1.01
3	New Hampshire	1.8	3.45	0.95
4.5	North Dakota	1.9	3.35	0.92
4.5	Utah	1.9	3.35	0.92
6	Wisconsin	2.0	3.25	0.90
7.5	Oregon	2.2	3.05	0.84
7.5	Idaho	2.2	3.05	0.84
9	Wyoming	2.3	2.95	0.81
11	Massachusetts	2.4	2.85	0.79
11	Maine	2.4	2.85	0.79
11	Minnesota	2.4	2.85	0.79
13	Colorado	2.5	2.75	0.76
14	Connecticut	2.7	2.55	0.70
15.5	Rhode Island	2.8	2.45	0.67
15.5	California	2.8	2.45	0.67
17	Washington	2.9	2.35	0.65
19	New York	3.0	2.25	0.62
19	Iowa	3.0	2.25	0.62
19	Kansas	3.0	2.25	0.62
21	Nebraska	3.1	2.15	0.59
22	Nevada	3.3	1.95	0.54
23	Montana	3.4	1.85	0.51
24	New Jersey	3.5	1.75	0.48
25	Pennsylvania	3.6	1.65	0.45
26	Kentucky	4.0	1.25	0.34
27	Ohio	4.1	1.15	0.32
28	Michigan	4.5	0.75	0.21
29	Indiana	4.7	0.55	0.15
30	Arizona	4.8	0.45	0.12
31.5	West Virginia	5.3	−0.05	−0.01
31.5	Illinois	5.3	−0.05	−0.01
33.5	Tennessee	6.5	−1.25	−0.34
33.5	Missouri	6.5	−1.25	−0.34
35.5	Maryland	6.7	−1.45	−0.40
35.5	New Mexico	6.7	−1.45	−0.40
37	North Carolina	7.0	−1.75	−0.48
38	Virginia	7.1	−1.85	−0.51
39	Delaware	7.7	−2.45	−0.67
40	Oklahoma	8.5	−3.25	−0.90
41	Arkansas	10.5	−5.25	−1.45
42	Texas	11.2	−5.95	−1.64
43	Alabama	11.5	−6.25	−1.72
44	Louisiana	12.1	−6.85	−1.89
45	South Carolina	13.1	−7.85	−2.16
46	Mississippi	13.2	−7.95	−2.19
47	Florida	13.3	−8.05	−2.22
48	Georgia	13.6	−8.35	−2.30
	Mean	5.25		
	Standard deviation	3.63		

TABLE 18.—FORTY-EIGHT STATES RANKED ACCORDING TO *Per-capita* INCOME (KNAUTH'S RATINGS), 1919

Rank	State	*Per-capita* income, 1919	Deviation from the mean	Standard score
1	New York	$874	280.33	1.84
2	Nevada	850	256.33	1.68
3	California	820	226.33	1.48
4	Delaware	792	198.33	1.30
5	Wyoming	789	195.33	1.28
6	Massachusetts	788	194.33	1.27
7	Washington	786	192.33	1.26
8	Illinois	765	171.33	1.12
9	New Jersey	758	164.33	1.08
10	Rhode Island	720	126.33	0.83
11	Connecticut	717	123.33	0.81
12	Oregon	711	117.33	0.77
13	Iowa	706	112.33	0.74
14	Michigan	704	110.33	0.72
15	Nebraska	702	108.33	0.71
16.5	Ohio	689	95.33	0.62
16.5	Maryland	689	95.33	0.62
18	South Dakota	685	91.33	0.60
19	Pennsylvania	683	89.33	0.59
20	Arizona	664	70.33	0.46
21	Colorado	639	45.33	0.30
22	Idaho	604	10.33	0.07
23	Kansas	602	8.33	0.05
24	New Hampshire	597	3.33	0.02
25	Maine	583	− 10.67	−0.07
26.5	Minnesota	581	− 12.67	−0.08
26.5	Indiana	581	− 12.67	−0.08
28	Wisconsin	557	− 36.67	−0.24
29	Texas	538	− 55.67	−0.36
30	Missouri	535	− 58.67	−0.38
31	Oklahoma	534	− 59.67	−0.39
32	Vermont	529	− 64.67	−0.42
33	Utah	517	− 76.67	−0.50
34	North Dakota	515	− 78.67	−0.52
35	Montana	512	− 81.67	−0.54
36	West Virginia	448	−145.67	−0.95
37	South Carolina	437	−156.67	−1.04
38.5	Louisiana	429	−164.67	−1.08
38.5	Virginia	429	−164.67	−1.08
40	Florida	420	−173.67	−1.14
41	New Mexico	408	−185.67	−1.22
42	Georgia	394	−199.67	−1.31
43	Kentucky	392	−201.67	−1.32
44	North Carolina	383	−210.67	−1.38
45	Arkansas	379	−214.67	−1.41
46	Tennessee	365	−228.67	−1.50
47	Mississippi	351	−242.67	−1.59
48	Alabama	345	−248.67	−1.63
	Mean	593.67		
	Standard deviation	152.65		

TABLE 19.—FORTY-EIGHT STATES RANKED ACCORDING TO THE RATIO OF *Per-capita* SAVINGS-BANK DEPOSITS TO *Per-capita* INCOME

(Data from *Research Bulletin*, Nat'l Education Ass'n, Jan., 1923, Table 6, p. 21)

Rank	State	Ratio savings to income	Deviation from the mean	Standard score
1	Vermont	0.737	0.508	3.34
2	New Hampshire	0.572	0.343	2.25
3	Connecticut	0.521	0.292	1.92
4	Maine	0.519	0.290	1.91
5	Rhode Island	0.497	0.268	1.76
6	Massachusetts	0.491	0.262	1.72
7	California	0.403	0.174	1.14
8	New York	0.396	0.167	1.10
9.5	Minnesota	0.341	0.112	0.74
9.5	North Dakota	0.341	0.112	0.74
11	Iowa	0.2818	0.053	0.35
12	New Jersey	0.2810	0.052	0.34
13	Maryland	0.280	0.051	0.34−
14	South Dakota	0.267	0.038	0.25
15	Montana	0.256	0.027	0.18
16	Wisconsin	0.253	0.024	0.16
17	Pennsylvania	0.251	0.022	0.14
18	Michigan	0.244	0.015	0.10
19	Ohio	0.2148	−0.014	−0.09
20	Delaware	0.2141	−0.015	−0.10
21	Nevada	0.203	−0.026	−0.17
22	West Virginia	0.202	−0.027	−0.18−
23	Utah	0.201	−0.028	−0.18
24	Illinois	0.189	−0.040	−0.26
25	Virginia	0.179	−0.050	−0.33
26	Colorado	0.172	−0.057	−0.37
27	Indiana	0.169	−0.060	−0.39
28	Florida	0.160	−0.069	−0.45
29	Missouri	0.151	−0.078	−0.51
30	Louisiana	0.148	−0.081	−0.53
31	Oregon	0.142	−0.087	−0.57
32	Wyoming	0.135	−0.094	−0.62
33	Nebraska	0.132	−0.097	−0.64
34	Tennessee	0.128	−0.101	−0.66
35	Washington	0.123	−0.106	−0.70
36	South Carolina	0.119	−0.110	−0.72
37	Kentucky	0.117	−0.112	−0.74
38	Arizona	0.112	−0.117	−0.77
39	North Carolina	0.107	−0.122	−0.80
40	Georgia	0.104	−0.125	−0.82
41	Kansas	0.102	−0.127	−0.83
42	New Mexico	0.095	−0.134	−0.88
43	Idaho	0.092	−0.137	−0.90
44	Mississippi	0.085	−0.144	−0.95
45	Alabama	0.078	−0.151	−0.99
46	Oklahoma	0.071	−0.158	−1.04
47	Arkansas	0.052	−0.177	−1.16
48	Texas	0.050	−0.79	−1.18
	Mean	0.2287		
	Standard deviation	0.1522		

TABLE 20.—FORTY-EIGHT STATES RANKED ACCORDING TO AN INDEX NUMBER OF INTELLIGENCE AND LEADERSHIP BASED UPON A COMBINATION OF THE STANDARD SCORES OF TABLES 10, 11, 12, AND 13

Rank	State	Index number	Rank	State	Index number
1	California	6.56	25	South Dakota	0.51
2	Massachusetts	5.78	26	New Jersey	0.30
3	Oregon	5.63	27	Wisconsin	−0.025
4	Washington	5.44	28	Kansas	−0.31
5	Connecticut	4.88	29	Delaware	−0.45
6	Vermont	3.76	30	Indiana	−0.50
7	New Hampshire	3.74	31.5	Arizona	−0.93
8	Wyoming	3.69	31.5	Maryland	−0.93
9	Nevada	3.49	33	Missouri	−1.17
10	Rhode Island	2.78	34	Virginia	−2.31
11	Colorado	2.77	35	Oklahoma	−2.46
12	Maine	2.54	36	West Virginia	−2.75
13	Montana	2.41	37	Texas	−2.78
14	Utah	2.29	38	New Mexico	−3.06
15	New York	2.22	39	Florida	−4.07
16	Ohio	1.94	40	Kentucky	−4.43
17	Idaho	1.92	41	Louisiana	−4.86
18	North Dakota	1.64	42	North Carolina	−4.90
19	Minnesota	1.63	43	Tennessee	−4.98
20	Michigan	1.37	44	South Carolina	−5.45
21	Nebraska	1.12	45	Alabama	−5.46
22	Iowa	1.10	46	Georgia	−5.64
23	Illinois	0.86	47	Arkansas	−5.71
24	Pennsylvania	0.68	48	Mississippi	−6.53

TABLE 21.—FORTY-EIGHT STATES RANKED ACCORDING TO INDEX-NUMBERS OF MORALITY AND RESPECT FOR FUNDAMENTAL LAW. THESE INDEX-NUMBERS COMBINE THE STANDARD SCORES OF TABLES 14, 15, 16, AND 17

Rank	State	Index number	Rank	State	Index number
1.5	New Hampshire	4.66	25	Washington	0.81
1.5	Vermont	4.66	26	Ohio	0.74
3	Maine	4.00	27	Illinois	0.54
4	Wisconsin	3.85	28	Maryland	0.04
5	Rhode Island	3.69	29	Wyoming	0.003
6	North Dakota	3.64	30	Arizona	−0.27
7	South Dakota	3.55	31	Missouri	−0.97
8	Idaho	3.45	32	California	−1.18
9	Minnesota	3.09	33	West Virginia	−1.48
10	Massachusetts	3.06	34	Kentucky	−1.86
11	Connecticut	3.03	35	Virginia	−2.24
12	New Jersey	2.74	36	North Carolina	−2.40
13	Iowa	2.70	37	New Mexico	−2.53
14	Nebraska	2.57	38	Nevada	−2.61
15	Pennsylvania	2.27	39	Arkansas	−2.68
16	Michigan	2.03	40	Mississippi	−4.44
17	Oregon	1.95	41	Tennessee	−4.47
18	New York	1.77	42	Texas	−4.92
19	Kansas	1.61	43	Alabama	−5.17
20	Indiana	1.50	44	Louisiana	−5.64
21	Utah	1.32	45	South Carolina	−5.65
22	Delaware	1.11	46	Oklahoma	−5.91
23	Colorado	0.99	47	Florida	−8.79
24	Montana	0.78	48	Georgia	−8.89

TABLE 22.—FORTY-EIGHT STATES RANKED ACCORDING TO INDEX-NUMBERS REPRESENTING ECONOMIC EFFICIENCY. THESE NUMBERS COMBINE THE STANDARD SCORES OF TABLES 18 AND 19

Rank	State	Index number	Rank	State	Index number
1	Massachusetts	2.99	25	Colorado	−0.07
2	New York	2.94	26	Wisconsin	−0.08
3	Vermont	2.91	27	Arizona	−0.31
4	Connecticut	2.73	28	Montana	−0.36
5	California	2.62	29	Indiana	−0.47
6	Rhode Island	2.59	30	Utah	−0.68
7	New Hampshire	2.27	31	Kansas	−0.78
8	Maine	1.84	32	Idaho	−0.83
9	New Jersey	1.42	33	Missouri	−0.89
10	Delaware	1.20	34	West Virginia	−1.13
11	Iowa	1.10	35	Virginia	−1.41
12	Maryland	0.96	36	Oklahoma	−1.43
13	Illinois	0.86	37	Texas	−1.54
14	South Dakota	0.85	38	Florida	−1.59
15	Michigan	0.82	39	Louisiana	−1.61
16	Pennsylvania	0.73	40	South Carolina	−1.76
17.5	Minnesota	0.66	41	Kentucky	−2.06
17.5	Wyoming	0.66	42	New Mexico	−2.10
19	Washington	0.56	43	Georgia	−2.13
20	Ohio	0.53	44	Tennessee	−2.16
21	Nevada	0.51	45	North Carolina	−2.18
22	North Dakota	0.26	46	Mississippi	−2.54
23	Oregon	0.20	47	Arkansas	−2.57
24	Nebraska	0.07	48	Alabama	−2.62

TABLE 23.—FORTY-EIGHT STATES RANKED ACCORDING TO THEIR COMBINED STANDARD SCORES ON FOUR MEASURES OF INTELLIGENCE AND LEADERSHIP, FOUR MEASURES OF MORALITY AND RESPECT FOR FUNDAMENTAL LAW, AND TWO MEASURES OF ECONOMIC EFFICIENCY

Rank	State	Combined score	Rank	State	Combined score
*1	Massachusetts	11.83	25	Montana	2.83
*2	Vermont	11.34	26	Nevada	2.39
*3	New Hampshire	10.67	*27	Illinois	2.26
4	Connecticut	10.64	28	Delaware	1.86
5	Rhode Island	9.03	*29	Indiana	0.75
*6	Maine	8.38	30	Kansas	0.52
7	California	8.00	*31	Maryland	0.07
8	Oregon	7.78	32	Arizona	− 1.51
*9	New York	6.93	*33	Missouri	− 3.03
10	Washington	6.81	34	West Virginia	− 5.36
11	North Dakota	5.54	*35	Virginia	− 5.96
12	Minnesota	5.29	36	New Mexico	− 7.69
13	South Dakota	4.91	*37	Kentucky	− 7.95
*14	Iowa	4.90	*38	North Carolina	− 9.48
15	Idaho	4.40	39	Oklahoma	− 9.81
16	New Jersey	4.37	*40	Texas	−10.26
17	Wyoming	4.35	*41	Arkansas	−10.61
*18	Michigan	4.22	*42	Tennessee	−11.61
19	Nebraska	3.76	*43	Louisiana	−12.38
*20	Wisconsin	3.75	*44	South Carolina	−12.86
21	Colorado	3.69	*45	Alabama	−13.25
*22	Pennsylvania	3.68	*46	Mississippi	−13.51
*23	Ohio	3.21	47	Florida	−14.22
*24	Utah	2.93	*48	Georgia	−16.77

* For 26 states with relatively stable populations, the correlation of this ranking with the median school-ratings, 1880-1910, is 0.90. The closest resemblance is to the school ratings for 1890, where the correlation is 0.91.

D

A Modified Form of the Ayres Index Numbers for State School Systems

Most of the comparisons discussed in Chapters IV and V have been based on a modified form of the Ayres "Index Numbers for State School Systems." As explained in Chapter IV, only five of the ten components used by Dr. Ayres were considered in constructing our modified school ratings—namely, the first, second, third, fourth, and seventh. The first three indicate the "reach" and "holding power" of the schools by recording the per cent of the school population enrolled in the public schools, the per cent of those enrolled who are in average daily attendance, and the average number of days that the schools are open each year. The fourth component is based on the per cent that high-school enrollment is of elementary-school enrollment. The seventh records the amount spent upon the schools *per capita* of school population. Three of the Ayres financial components are omitted, as well as his fourth component which is based on the ratio of boys to girls in the high school. For our purposes, it did not seem fair to let so much weight fall upon the financial components, particularly in view of the differences in cost of living in different parts of the country. Nor did it seem fair to include two separate high-school components as against three components that involve both high-school and elementary-school measures, particularly in view of the fact that it is *mass* education with which we are chiefly concerned in our comparisons. As a matter of fact, however, the evidence that we have presented would not be significantly changed if the comparisons were made on the basis of the original Ayres index numbers.

Another reason for reducing the number of components (we are frank to say) lay in the labor that is involved when the index-numbers are combined from standard scores rather than by averaging the components. The recent developments in statistical technique strongly confirm the use of the standard score in comparisons of this type.[1] The advantage lies in the fact that the

[1] The standard score is obtained by computing the deviations of each original score from the average of all of the scores, and then dividing each resulting deviation by the "standard" deviation. In order to do this, however, the standard deviation must be computed, and this is a time-consuming process. Each original

ratings are always expressed in comparable terms no matter how widely the units of the several measures may vary in magnitude. For example, Reeder's magazine ratings (Tables 11 and 12) are expressed in terms of per cents; the leadership ratings (Table 13) are in terms of the ratio 1 : 1,000,000; the median Alpha scores (Table 10) are in terms of an arbitrary unit. There is no way of combining the original scores of any one state on all of these measures. One could take, of course, the *rank* of the state on each list, and base a combined rating on the median or the mean of the rankings; and for some purposes this is fairly accurate and quite sufficient. Rank-order, however, assumes that the differences between a given rank and those just above it and below it are equal, and an inspection of our tables will show that this assumption is very seldom justified. By computing the standard scores, one is able not only to combine ratings based on different measures, but also to take a just account of the absolute differences that separate the several cases on each of the measures.

Dr. Ayres did not publish a set of index numbers for the year 1880—doubtless because the data for high-school enrollment in the Report of the Commissioner of Education are not given for this year on the same basis as for the years following 1890. It was highly desirable for our purposes, however, to have ratings for 1880, and in view of the fact that we used only one of the high-school components, we have ventured to employ the high-school data in the Commissioner's report, unsatisfactory though they are from some points of view. The "error" is possibly in the direction of somewhat greater accuracy, for the data in this case take account of private-school enrollment as well as public-school enrollment, and in determining the *total* educational influence that operates upon a given generation, the private schools should be included. In later decades, their omission is probably not so significant, for the public schools, and especially the public high schools, have come to enroll so large a proportion of the school population that the private-school enrollment is far less significant than formerly in comparing states. When smaller units are compared the parochial-school enrollment doubtless becomes a disturbing factor.

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score must be squared, and the mean of all the squares determined. The difference between this mean of the squared scores and the square of the mean of the original scores is then computed. The square-root of this difference is extracted. The result is the "standard deviation" or "sigma."

TABLE 24.—SCHOOL RATINGS FOR FORTY-FIVE STATES FOR 1880, BASED ON THE STANDARD SCORES OF EACH STATE ON THE 1ST, 2D, 3D, 4TH, AND 7TH COMPONENTS OF THE AYRES INDEX NUMBERS

State	1	2	3	4	7	Average	Rank
Alabama	−0.89	−1.13	−1.13	−0.81	−1.35	−1.06	41
Arizona	−0.29	−0.43	−0.32	−0.49	0.67	−0.17	27
Arkansas	−1.43	−1.41	−1.27	−0.80	−1.35	−1.25	44
California	0.54	0.79	0.73	0.81	2.28	1.03	3
Colorado	−0.36	−0.77	−0.88	−0.55	1.63	−0.19	29
Connecticut	0.83	1.70	1.64	0.37	1.04	1.12	2
Delaware	0.09	0.63	1.05	0.19	−0.19	0.35	20
Florida	−0.69	−0.70	−0.41	0.31	−1.23	−0.54	33
Georgia	−0.87	−1.30	−1.55	0.70	−1.27	−0.87	39
Idaho	1.28	1.45	0.83	−0.27	−0.06	0.65	11
Illinois	0.47	0.80	0.83	−0.53	0.73	0.46	17
Indiana	0.93	0.87	0.44	−0.60	0.50	0.43	18
Iowa	0.88	1.09	0.77	−0.12	1.23	0.73	8
Kansas	0.33	0.15	0.02	−0.98	0.09	−0.08	25
Kentucky	−0.33	−0.56	−0.51	−0.35	−1.18	−0.39	32
Louisiana	−1.92	−1.32	−0.07	−0.91	−1.14	−1.07	42
Maine	1.70	1.01	−0.01	0.19	0.22	0.62	12
Maryland	−0.66	0.24	1.55	−0.17	0.01	0.19	23
Massachusetts	1.16	1.98	1.58	−0.41	1.93	1.25	1
Michigan	0.50	0.65	0.58	−0.84	0.36	0.25	21
Minnesota	0.79	−0.12	−0.74	−0.11	0.49	−0.13	26
Mississippi	0.13	−0.74	−1.20	−0.38	−0.97	−0.63	36
Missouri	−0.67	−0.77	−0.57	−0.66	−0.29	−0.59	35
Montana	−0.10	−0.53	−0.68	1.64	1.07	0.24	22
Nebraska	0.43	−0.01	−0.32	−0.93	0.90	0.01	24
Nevada	0.71	0.84	0.63	−0.45	2.21	0.79	7
North Carolina	−0.53	−1.34	−1.85	−0.42	−1.38	−1.10	43
*North Dakota							
New Hampshire	1.70	0.63	−0.42	1.36	0.47	0.95	4
New Jersey	−0.27	0.86	2.00	0.23	0.18	0.60	13
New Mexico	−2.44	−1.60	0.32	1.80	−0.92	−0.57	34
New York	0.24	1.14	1.64	0.56	0.67	0.85	5
Ohio	0.80	1.07	0.83	−0.69	0.60	0.52	16
*Oklahoma							
Oregon	1.20	−0.01	−0.86	2.20	0.24	0.55	14
Pennsylvania	0.63	0.87	0.74	−0.52	0.12	0.37	19
Rhode Island	0.23	1.22	1.78	−0.49	0.73	0.69	9
South Carolina	−0.67	−1.07	−1.21	−0.53	−1.32	−0.96	40
*South Dakota							
Tennessee	−0.19	−1.02	−1.46	0.19	−1.20	−0.74	37
Texas	−2.20	−1.72	−1.32	−0.48	−1.18	−1.38	45
Utah	−0.29	−0.14	0.21	4.27	−0.80	0.65	10
Virginia	−1.00	−0.83	−0.21	−0.63	−1.04	−0.74	38
Vermont	1.28	0.86	0.13	2.02	−0.08	0.84	6
Washington	0.61	−0.34	−0.92	−0.49	0.05	−0.22	30
Wisconsin	0.71	1.25	1.18	−0.54	1.01	0.52	15
West Virginia	0.38	−0.23	−0.60	−0.58	−0.59	−0.32	31
Wyoming	−0.34	−0.31	−0.04	−0.37	0.18	−0.18	28

* No data.

TABLE 25.—SCHOOL RATINGS FOR FORTY-SEVEN STATES FOR 1890, BASED ON THE STANDARD SCORES OF EACH STATE ON THE 1ST, 2D, 3D, 4TH, AND 7TH COMPONENTS OF THE AYRES INDEX NUMBERS

State	1	2	3	4	7	Average	Rank
Alabama	−1.16	−1.30	−1.31	−1.18	−1.40	−1.27	44
Arizona	−1.45	− .70	+ .11	− .80	+ .67	− .43	32
Akransas	− .82	−1.18	−1.27	− .92	−1.22	−1.08	41
California	+ .70	+1.04	+ .97	+ .14	+1.89	+ .95	5
Colorado	− .21	+ .24	+ .61	− .08	+1.97	+ .51	16
Connecticut	+1.33	+2.02	+1.64	+1.24	+1.21	+1.49	2
Delaware	− .35	+ .40	+ .98	+ .20	− .69	+ .11	21
Florida	+ .55	+ .16	− .05	− .86	− .93	− .23	27
Georgia	− .99	−1.29	−1.39	− .90	−1.43	−1.20	42
Idaho	− .32	−1.12	−1.40	− .81	− .25	− .78	38
Illinois	+ .55	+ .62	+ .55	+ .36	+ .42	+ .50	17
Indiana	+ .88	+ .67	+ .38	+ .03	− .11	+ .37	18
Iowa	+ .90	+ .95	+ .71	+ .77	+ .48	+ .76	9
Kansas	+1.00	+ .37	− .05	− .01	+ .48	+ .36	20
Kentucky	− .71	− .85	− .75	− .94	− .99	− .85	39
Louisiana	−2.18	−1.28	− .46	− .80	−1.30	−1.20	43
Maine	+1.69	+ .50	− .27	+1.77	− .10	+ .72	11
Maryland	−1.18	+ .29	+1.77	− .71	− .48	− .06	23
Massachusetts	+2.40	+2.64	+1.50	+2.46	+2.33	+2.27	1
Michigan	+ .41	+ .71	+ .76	+1.22	+ .11	+ .64	14
Minnesota	−1.16	−1.01	− .75	+1.01	+ .51	− .28	29
Mississippi	− .23	− .87	−1.05	−1.10	−1.26	− .90	40
Missouri	+ .16	− .33	− .48	− .48	− .43	− .31	34
Montana	− .02	+ .31	+ .57	+ .98	+1.32	+ .63	15
Nebraska	+ .13	− .77	−1.08	+ .29	+ .39	− .21	25
Nevada	+ .64	+ .63	+ .49	+1.09	+1.49	+ .87	6
North Carolina	− .97	−1.46	−1.70	−1.19	−1.48	−1.36	46
North Dakota	− .33	− .67	− .70	− .77	+ .78	− .34	31
New Hampshire	+ .97	+ .31	− .11	+1.87	+ .45	+ .70	12
New Jersey	+ .07	+1.30	+1.90	+ .30	+ .52	+ .82	8
New Mexico	−1.79	−1.61	−1.59	*	−1.32	−1.58	47
New York	+ .73	+1.68	+1.75	+ .97	+1.08	+1.24	4
Ohio	+ .86	+1.02	+ .82	+ .71	+ .30	+ .74	10
Oklahoma							
Oregon	+ .70	+ .20	− .10	− .53	+ .18	+ .09	22
Pennsylvania	+1.33	+1.19	+ .70	− .41	+ .43	+ .65	13
Rhode Island	+ .60	+1.62	+1.79	+1.58	+ .89	+1.30	3
South Carolina	−1.07	−1.33	−1.42	−1.10	−1.51	−1.28	45
South Dakota	+ .59	− .33	− .70	− .90	+ .76	− .12	44
Tennessee	+ .95	− .41	− .97	−1.13	−1.22	− .56	34
Texas	− .79	− .78	− .59	− .63	− .92	− .74	36
Utah	−1.39	− .58	+ .30	−1.20	− .74	− .72	35
Virginia	−1.02	− .68	− .24	− .73	−1.16	− .77	37
Vermont	+1.22	+ .85	+ .38	+1.74	+ .01	+ .84	7
Washington	+ .21	− .44	− .67	− .82	+ .69	− .21	26
Wisconsin	− .52	+ .41	+1.17	+1.01	− .22	+ .37	18
West Virginia	+ .30	− .41	− .67	− .98	− .79	− .51	33
Wyoming	−1.22	− .69	− .08	+ .20	+ .43	− .27	28

TABLE 26.—SCHOOL RATINGS FOR FORTY-EIGHT STATES FOR 1900, BASED ON THE 1ST, 2D, 3D, 4TH, AND 7TH COMPONENTS OF THE AYRES INDEX NUMBERS

State	1	2	3	4	7	Average	Rank
Alabama	− .35	−1.46	−1.80	−1.20	−1.48	−1.26	45
Arizona	−1.96	−1.24	− .34	−1.05	− .14	− .95	37
Arkansas	− .83	−1.62	−1.82	−1.07	−1.25	−1.32	47
California	+ .94	+1.17	+ .94	+ .69	+1.55	−1.06	5
Colorado	+1.64	+1.14	+ .43	+1.42	+2.20	+1.37	2
Connecticut	+ .47	+1.42	+1.65	+1.01	+ .76	+1.06	4
Delaware	− .19	+ .35	+ .75	+ .04	− .79	+ .03	28
Florida	− .71	−1.12	−1.34	− .93	−1.01	−1.02	39
Georgia	−1.30	−1.11	− .75	− .95	−1.32	−1.09	41
Idaho	+ .22	− .67	− .93	− .86	− .21	− .49	32
Illinois	+ .71	+ .88	+ .50	+ .20	+ .44	+ .55	17
Indiana	+1.16	+ .92	+ .50	+ .60	+ .10	+ .66	16
Iowa	+ .81	+ .88	+ .68	+1.26	+ .28	+ .78	9
Kansas	+ .98	+ .16	− .31	+ .43	− .08	+ .24	26
Kentucky	− .32	− .68	− .64	−1.01	−1.09	− .75	35
Louisiana	−2.15	−1.40	− .50	−1.12	−1.34	−1.30	46
Maine	+1.08	+ .59	+ .16	+1.63	− .06	+ .68	15
Maryland	−1.24	+ .21	+1.62	− .57	− .33	− .06	30
Massachusetts	+1.07	+1.83	+1.65	+1.95	+1.86	+1.67	1
Michigan	+ .55	+ .82	+ .80	+1.36	− .09	+ .69	13
Minnesota	− .05	+ .21	+1.03	+ .19	+ .12	+ .30	25
Mississippi	−1.53	−1.37	− .96	− .93	−1.35	−1.23	43
Missouri	− .10	+ .05	+ .25	− .02	− .39	− .04	29
Montana	+ .79	+ .41	+ .12	+ .83	+1.52	+ .73	12
Nebraska	+1.00	+1.12	− .03	+1.41	+ .55	+ .81	7
Nevada	+ .29	+ .48	+ .56	+1.71	+2.33	+1.07	3
North Carolina	−2.17	−2.10	−2.03	−1.51	−1.51	−1.86	48
North Dakota	+ .18	+ .47	+ .61	− .72	+1.03	+ .31	23
New Hampshire	+ .51	+ .15	− .02	+1.19	+ .19	+ .40	21
New Jersey	− .75	+ .47	+1.53	+ .37	+ .41	+ .41	20
New Mexico	− .93	−1.30	−1.23	−1.27	− .69	−1.08	40
New York	− .05	+ .99	+1.21	+1.01	+1.39	+ .91	6
Ohio	+ .47	+ .85	+ .90	+1.06	+ .15	+ .69	14
Oklahoma	+ .57	− .79	−1.27	−1.48	− .79	− .75	34
Oregon	+1.16	− .01	− .60	− .58	+ .65	+ .14	27
Pennsylvania	+ .02	+ .61	+ .96	− .28	+ .30	+ .32	22
Rhode Island	− .42	+ .81	+1.59	+1.09	+ .83	+ .78	10
South Carolina	− .99	−1.47	−1.48	− .94	−1.44	−1.26	44
South Dakota	+1.16	+1.18	− .21	− .25	+ .54	+ .48	18
Tennessee	+ .07	− .95	−1.25	−1.08	−1.32	− .91	36
Texas	−1.44	−1.28	− .87	− .28	−1.04	− .98	38
Utah	+ .98	+ .68	+ .47	− .86	+ .26	+ .31	24
Virginia	−1.98	−1.34	− .53	− .89	−1.22	−1.19	42
Vermont	+ .88	+ .87	+ .62	+1.02	+ .38	+ .75	11
Washington	+1.32	+ .91	+ .87	+ .32	+1.03	+ .79	8
Wisconsin	+ .21	+ .58	+ .75	+ .78	− .26	+ .41	19
West Virginia	− .19	− .82	− .93	−1.20	− .07	− .64	33
Wyoming	+ .38	− .51	− .81	−1.38	+ .41	− .38	31

TABLE 27.—SCHOOL RATINGS FOR FORTY-EIGHT STATES FOR 1910, BASED ON THE STANDARD SCORES OF EACH STATE ON THE 1ST, 2D, 3D, 4TH, AND 7TH COMPONENTS OF THE AYRES INDEX NUMBERS

State	1	2	3	4	7	Average	Rank
Alabama	−1.67	−1.71	−1.38	−1.25	−1.23	−1.45	48
Arizona	−1.41	−1.21	− .66	− .41	+ .21	− .68	34
Arkansas	− .47	−1.44	−1.80	−1.39	−1.08	−1.24	43
California	+ .23	+ .91	+1.17	+1.68	+1.41	+1.08	3
Colorado	+ .59	+ .41	+ .15	+1.40	+ .81	+ .67	11
Connecticut	+ .85	+1.44	+1.28	+ .64	+ .30	+ .90	5
Delaware	−1.26	− .33	+ .80	+ .22	− .61	− .24	31
Florida	+ .46	− .81	−1.82	−1.20	− .78	− .83	37
Georgia	−1.31	− .88	− .31	− .89	−1.14	− .91	38
Idaho	+ .64	− .12	− .60	− .30	+ .53	+ .03	28
Illinois	+ .52	+ .82	+ .74	+ .36	+ .55	+ .60	16
Indiana	+1.33	+ .57	− .21	+1.09	+ .33	+ .62	13
Iowa	+ .73	+ .96	+ .78	+1.27	− .44	+ .66	12
Kansas	+ .89	+ .81	+ .44	+ .65	+ .14	+ .59	17
Kentucky	− .92	−1.20	−1.07	−1.23	− .90	−1.06	41
Louisiana	−2.36	−1.70	− .66	−1.36	− .91	−1.40	47
Maine	+1.45	+1.02	+ .27	+1.07	− .09	+ .74	9
Maryland	−1.49	− .23	+1.29	− .44	− .68	− .31	32
Massachusetts	+1.25	+1.79	+1.33	+1.70	+ .87	+1.39	1
Michigan	+ .95	+1.07	+ .74	+ .65	+ .11	+ .70	10
Minnesota	+ .77	+ .31	− .13	+ .22	+ .40	+ .31	23
Mississippi	−1.16	−1.13	−1.15	−1.27	−1.22	−1.19	42
Missouri	− .12	− .05	+ .11	− .08	− .41	− .11	30
Montana	− .29	+ .61	+1.27	+ .09	+1.20	+ .58	18
Nebraska	+ .25	+ .71	+ .86	+1.02	+ .25	+ .62	14
Nevada	−1.21	− .89	− .27	+1.20	+1.57	+ .08	26
North Carolina	− .45	−1.55	−1.98	−1.39	−1.22	−1.32	44
North Dakota	+ .33	+ .03	− .19	− .65	+ .83	+ .06	27
New Hampshire	+ .33	+ .48	+ .46	+1.24	− .02	+ .50	20
New Jersey	+ .07	+ .86	+1.25	* .00	+ .84	+ .60	15
New Mexico	−1.04	−1.82	−2.06	−1.07	− .79	−1.36	45
New York	+ .39	+1.18	+1.39	+ .70	+ .64	+ .86	7
Ohio	+1.20	+1.18	+ .70	+ .85	+ .51	+ .89	6
Oklahoma	+ .31	− .77	− .48	−1.19	− .45	− .52	33
Oregon	+1.37	+ .32	− .56	+ .52	+ .86	+ .50	19
Pennsylvania	+ .21	+ .56	+ .70	− .15	+ .28	+ .32	22
Rhode Island	− .05	+1.00	+1.61	+1.25	+ .24	+ .81	8
South Carolina	− .66	−1.55	−1.86	−1.48	−1.29	−1.37	46
South Dakota	− .56	− .02	+ .54	+ .07	+ .41	+ .09	25
Tennessee	+ .11	− .58	− .88	−1.38	−1.05	− .76	35
Texas	−1.26	−1.24	− .84	− .44	− .80	− .92	39
Utah	+ .74	+ .75	+ .49	− .56	+ .64	+ .41	21
Virginia	−1.56	−1.20	− .48	− .79	−1.01	−1.01	40
Vermont	+2.04	+1.42	+ .31	+ .60	+ .23	+ .92	4
Washington	+1.23	+1.3	+ .78	+1.56	+2.02	+1.38	2
Wisconsin	− .70	+ .22	+1.09	+ .96	− .22	+ .27	24
West Virginia	+ .31	− .37	− .72	−1.53	− .58	− .78	36
Wyoming	+ .38	+ .07	− .45	− .56	+ .70	+ .03	29

TABLE 28.—SCHOOL RATINGS FOR FORTY-EIGHT STATES FOR 1920, BASED ON THE STANDARD SCORES OF EACH STATE ON THE 1ST, 2D, 3D, 4TH, AND 7TH COMPONENTS OF THE AYRES INDEX NUMBERS

State	1	2	3	4	7	Average	Rank
Alabama	−1.58	−2.08	−1.96	−1.02	−1.45	−1.62	46
Arizona	− .84	− .52	+ .12	− .63	+1.37	− .10	30
Arkansas	− .25	−1.28	−1.79	−1.12	−1.36	−1.16	42
California	+1.48	+1.52	+ .73	+3.42	+1.34	+1.70	1
Colorado	+ .67	+ .71	+ .41	+ .25	+ .63	+ .53	15
Connecticut	+ .44	+1.10	+1.23	+ .43	+ .32	+ .70	10
Delaware	−1.01	− .08	+1.14	− .58	− .52	− .21	32
Florida	+ .15	− .85	−1.43	−1.17	− .80	− .82	39
Georgia	−1.29	−1.31	− .81	− .94	−1.54	−1.18	43
Idaho	+1.32	+1.36	+ .66	+ .35	+1.27	+ .99	5
Illinois	+ .19	+ .47	+ .57	+ .30	+ .05	+ .32	23
Indiana	+ .59	+ .22	− .24	+ .97	+ .32	+ .37	20
Iowa	+1.08	+1.23	+ .73	− .01	+ .89	+ .78	8
Kansas	+ .95	+ .76	+ .20	+1.03	+ .62	+ .71	9
Kentucky	−1.45	−2.01	−1.97	−1.48	−1.46	−1.67	47
Louisiana	−1.84	−1.54	− .60	− .86	−1.05	−1.18	44
Maine	+ .60	+ .58	+ .47	+1.00	− .35	+ .46	17
Massachusetts	− .04	+ .59	+1.01	+1.25	+ .16	+ .59	13
Maryland	−1.49	− .50	+1.02	− .86	− .94	− .55	36
Michigan	+ .01	+ .38	+ .62	+ .58	+ .53	+ .42	19
Minnesota	+ .59	+ .37	− .01	+ .53	+ .69	+ .43	18
Mississippi	−2.09	−2.37	−2.03	−1.22	−1.56	−1.85	48
Missouri	+ .28	+ .26	+ .13	+ .14	− .45	+ .07	27
Montana	+ .95	+ .85	+ .32	+ .35	+2.10	+ .91	7
Nebraska	+1.04	+ .82	+ .23	− .04	+ .76	+ .56	14
Nevada	+1.23	+1.07	+ .36	+1.28	+2.15	+1.22	2
North Carolina	− .42	−1.14	−1.39	−1.46	− .67	−1.02	40
North Dakota	+ .65	+ .66	+ .36	− .84	+1.00	+ .37	21
New Hampshire	− .84	− .18	+ .76	+ .58	− .23	− .02	28
New Jersey	+ .04	+1.18	+1.52	− .17	+ .47	+ .61	12
New Mexico	− .62	− .29	+ .25	−1.38	− .22	− .45	34
New York	− .28	+ .69	+1.47	+ .69	+ .08	+ .53	16
Ohio	+ .13	+ .23	+ .24	+ .76	+ .34	+ .34	22
Oklahoma	− .50	− .16	+ .32	− .76	− .33	− .29	33
Oregon	+2.17	+1.09	− .44	+1.69	+ .58	+1.02	4
Pennsylvania	− .46	+ .19	+ .87	− .40	− .49	− .06	29
Rhode Island	−1.12	− .14	+1.15	− .09	− .45	− .13	31
South Carolina	− .20	−1.81	−2.68	−1.07	−1.46	−1.44	45
South Dakota	− .52	− .16	+ .36	− .04	+1.03	+ .13	25
Tennessee	+ .65	− .54	−1.41	−1.20	−1.33	− .77	38
Texas	− .92	− .77	− .25	+ .07	− .89	− .55	35
Utah	+1.72	+1.39	+ .32	+ .48	+ .83	+ .95	6
Virginia	−1.17	−1.18	− .70	−1.04	−1.12	−1.04	41
Vermont	− .01	+ .03	+ .09	+1.25	− .03	+ .27	24
Washington	+1.15	+1.37	+ .85	+1.23	+1.08	+1.14	3
Wisconsin	− .76	− .07	+ .80	+ .69	− .15	+ .10	26
West Virginia	− .08	− .78	−1.13	−1.02	− .78	− .76	37
Wyoming	+1.47	− .64	− .44	+ .07	+1.68	+ .68	11

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